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PRACTICAL
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TREATISE No. 15.

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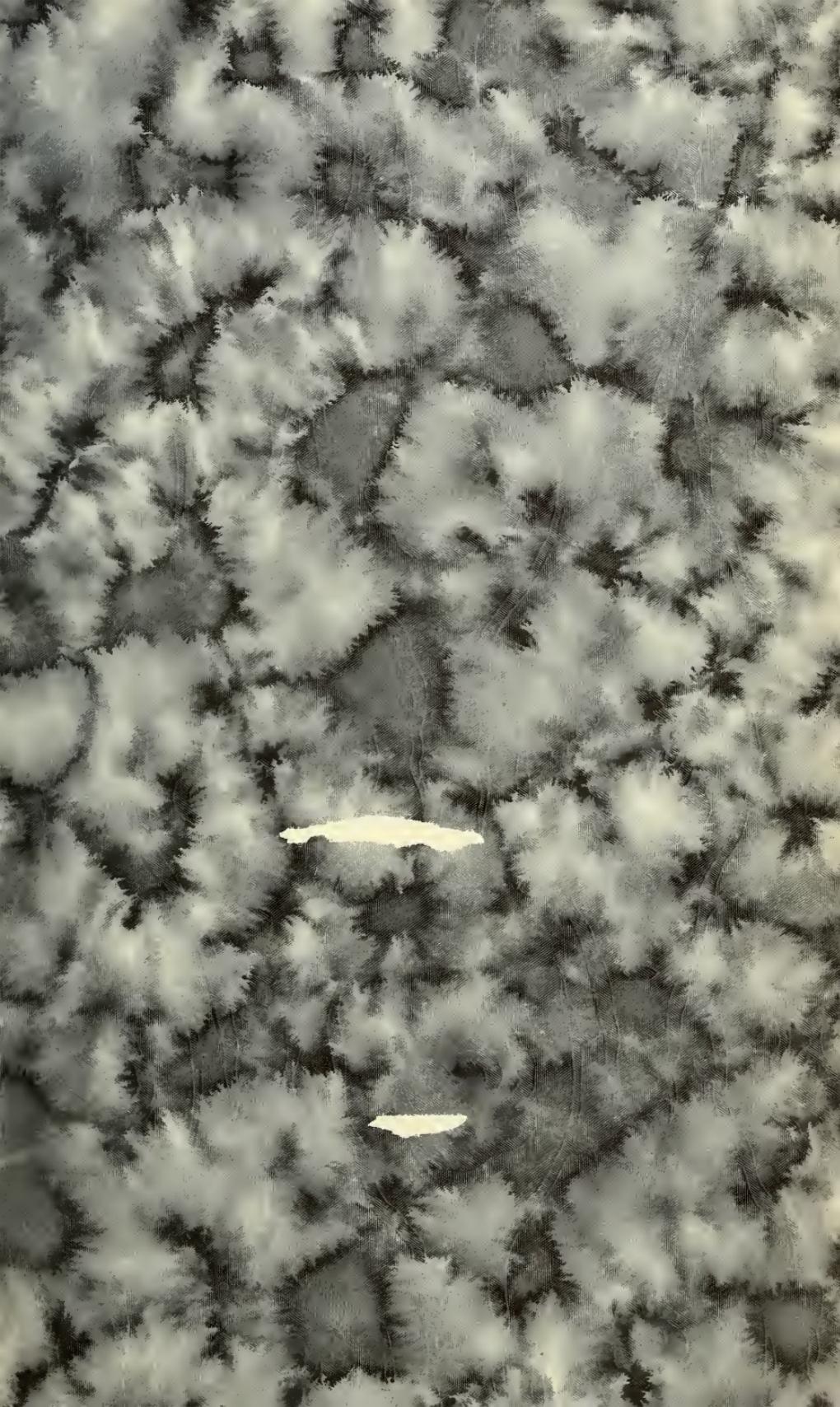
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In Memory of

Professor John C. Broadmeadow
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PRACTICAL :: ROLLER :: COVERING

Treatise No. 15.

*The Roller Coverer's
"VADE MECUM."*

A Treatise on the practice of
covering Cotton Spinners'
Draft Rollers with
Cloth and
Leather.

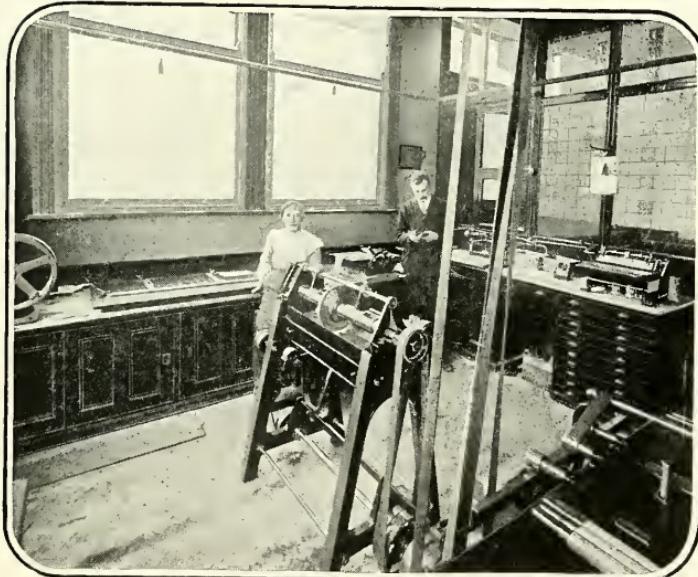
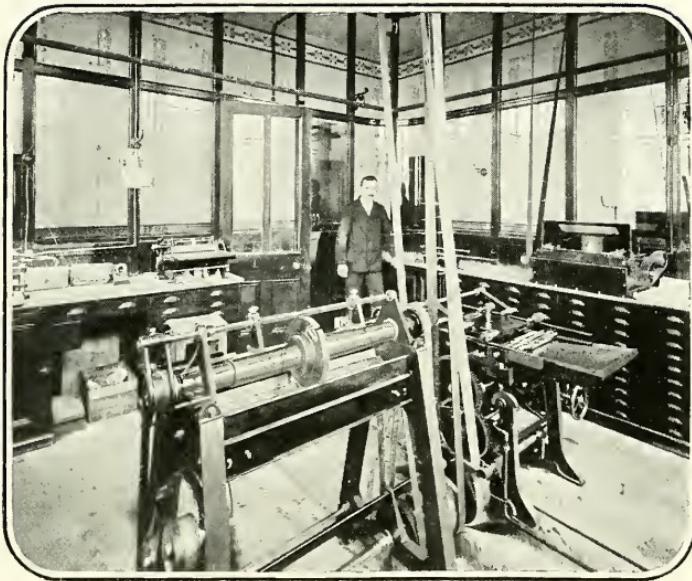
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The Roller-Covering Department of a Modern Cotton Mill.

(Note the compact Roller Rack-drawers and Sliding-doors to Cupboards.)

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Foreword.

WE are indebted to our clients, the world over, for their warm interest in and appreciation of our previous publication entitled "Leather Rollers," which edition is now exhausted. The demand for this little work, however, is yet so insistent, that we are compelled to meet the same by publishing another and more up-to-date treatise, which we have great pleasure in presenting herewith.

The above-mentioned brochure was published 11 years ago, and it will be readily seen that in this space of time changes must have taken place of sheer necessity, and we are glad to be able to place before our readers several new features in the shape of new machines and improved appliances.

We wish to point out that our new publication,— "PRACTICAL ROLLER-COVERING" is not intended as a catalogue; it is purely and simply an effort to expose to the full extent the best and latest methods of covering draft rollers. Our catalogue may be had for the asking by any bona-fide person interested in the trade.

We feel sure the contents of this little book will prove of service to the reader in some form or other, and this knowledge carries with it our reward for its publication.

DRONSFIELD BROTHERS LIMITED.

1922.

The Advent of Roller-Covering Machinery.

FOR many years the covering of leather rollers was carried on in a very haphazard and rule-of-thumb sort of way. Primitive appliances and antiquated methods were the order of the day. The roller-coverer was a sort of odd-job man, whose duty it was not only to cover the rollers (a delicate task in itself), but also to piece straps, weigh coal, attend the enquiry window, and make frequent excursions into the mill upon some errand or other.

Little wonder, then, that the art of roller-covering suffered through sheer lack of specialization and co-ordination.

The roller-coverer's appliances were, as stated, at that time very primitive, and consisted of hand-splicing knives for 'splicing' or bevelling the leather; a press, often a dead-weight plate worked with a foot-treadle; a drawing-on spring, also worked by the foot with a rope attachment, and an ending machine; even this latter was non-existent in some districts where the ending was done by hot irons.

Like breeds like, and as roller-covering was, for many years, looked upon as a 'secret' trade, the methods adopted were very little changed, the roller-coverer teaching his art to some relative or friend of a younger generation. However, as time went on, antiquated methods with their accompanying mediocre results had to be scrapped. Machinery of all kinds was coming to the fore; things were going at a quicker pace and with better results all round, and it was 'up to' inventive brains to re-organize roller-covering methods and devise machinery to do the work in such a manner as the times and the trade demanded.

It was then that we studied this question and, seeing the possibilities, we designed and placed upon the market, not without

some difficulties, first one machine and then another, until eventually we had a plant of machines which could produce greater output with perfect results. This plant of machines, which is fully dealt with in this brochure, is now in universal use in every cotton-manufacturing country of the world. Dronfield's Roller-Covering Machines are being used daily by the natives of India, and the Orientals of China and Japan with the same ease as by the operatives of Lancashire. They have become part and parcel of the standard equipment of the cotton-spinning mill, and few would have the temerity to start up a mill to-day with the old-fashioned equipment.

The advent of these machines was the signal for routinization, greater cleanliness of the roller-covering precincts, more delicate handling of the rollers, keeping in mind the delicate work they have to perform, greater care in the preservation of the stock, and the careful storage of finished rollers. The old system of hanging finished rollers up in racks upon the walls is now nearly, but not quite, obsolete; to those who still persist in this costly system we would advise rack-drawers (see page 67) where the rollers are preserved from the accumulation of dust and grime.

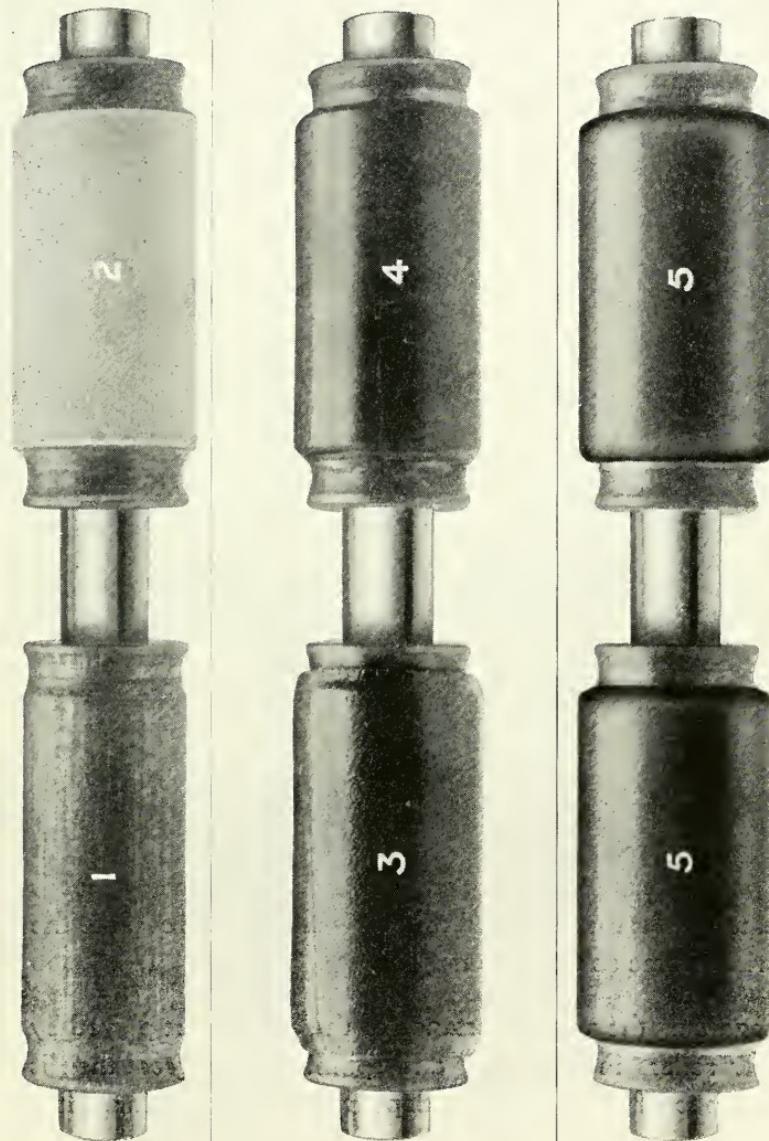
The plan of the roller-covering department of a modern cotton-spinning mill, illustrated on page 68, gives a clear idea of how such a room can be set out, leaving space for working; it also indicates all detail which should be studied by the joiner in designing the benches, drawers, and cupboards. Of course this plan will not agree with every shape and size of room but it will serve its purpose in general.

We do not propose to enter into the question of prices in this book; as we have stated this is intended as a treatise and not as a catalogue, but we would state that the cost of the whole necessary plant will soon be repaid by the greater efficiency and economy resulting.

Evolution of a Spinning Roller.

Dronsfield Bros. Ltd.,

"Practical Roller Covering."



1. BARE.
2. COVERED WITH CLOTH.
(Note the clean-cut edges, and well-closed joint.)
3. LEATHER "HOT" DRAWN ON.
4. ROLLER "ENDED."
5. AFTER CALENDERING (The Perfect Roller).

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Draft Rollers and their relation to Spinning.

THE Manager of a large spinning concern, when asked what he considered was the most important single adjunct in the Mill necessary to the production of good yarn, replied :—

“ In my long experience, I have for many years held the opinion that the leather rollers play a greater part in the production of good or bad yarn as the case may be, than all else in the Mill. You cannot take too much pains in keeping up the condition of the leather rollers, as you will be amply repaid. With such a plant of machines as can now be bought specially designed for covering rollers, and given good leather and cloth, no manager should be in the position of complaining about his rollers.”

When one comes to consider the part played by leather rollers in the spinning of cotton yarn, one is duly impressed by their great importance. The quality of yarn depends upon the condition of the leather rollers, be they good, bad, or indifferent.

Perfect rollers produce the best yarn; badly-covered rollers cannot produce good yarn.

It must be remembered that the sliver from its very inception into the preparatory machinery, *i.e.*, the drawing frame, proceeds to be treated by leather-covered rollers right away through to the mule or ring-frame as the case may be.

Recognizing the vast importance of the actual part played by the leather rollers in preparing and spinning, how great then is the importance of the methods adopted in their covering. It is to further the improvement in roller-covering methods that this brochure is published.

The Stock.

1. ROLLER CLOTH.

"Cushion." It has been found that leather alone cannot in itself provide the requisite amount of 'cushion' in the process of drawing or attenuating the sliver, so to produce the cushion effect a covering of cloth is first applied to the roller and upon this cloth a leather sheath or 'hot' is mounted.

All-wool The cloth in use varies in different countries. In *cloth best*. England the cloth in general use is of the best, all-wool, evenly woven, and well milled. A really good cloth of this character will retain its cushion effect sufficiently long to last several leather coverings; it will also retain for a long period a true surface without undue hollowing.

In some countries, the United States of America for instance, it is the general custom to use a very inferior felted cloth of a slate-blue colour; this cloth will retain its cushion for the lifetime of one leather covering only, at which period it will have become "dead" and badly hollowed with the traverse of the sliver, hence the roller has to be re-covered with new cloth every time it is re-covered with new leather. From careful observation and enquiries we may say that the English system of using the best-procurable all-wool cloth is the cheapest in the end and gives the best all-round results.

Cloth- The standard width of cloth used is 27 inches.

Weights used. The weights used per yard vary from 9 to 26 ounces; the majority use from 16 to 22 ounces. Some fine-count spinning mills have adopted a system of covering with two layers of cloth, say 9 oz. and 16 oz.

2. ROLLER LEATHER.

"Trust the Expert." The choice of Roller Skins is an important factor, both from a working as from an economic standpoint. In fact, it is difficult for any but those expert in leather manufacture to 'grade' roller skins, and we

would advise users to place themselves in the hands of some bona-fide known manufacturing expert with a view to securing the right kind of skin, specially suited to their peculiar needs, and taking into account in practice the average costs and results.

Qualities. Roller Leather is made of several kinds of skin, viz.—sheep, lamb, calf, goat, &c. Welsh sheep-skin preponderates to a large extent in the spinning mills of England, and during the past few years has been largely adopted on the European Continent and in America. Calf-skin is generally favoured on the Continent but is little used in England; in countries of the former the opinion prevails that calf-skin, in spite of its higher cost, is cheaper in the end than sheep-skin on account of its heavier nature, greater resilience, and adaptability to frequent truing up by grinding, but in our opinion the real reason is that they cannot obtain locally the fine qualities of sheep-skin as manufactured by the British Tanners and have taken advantage of a good local production, viz., calf.

The Finest Skins. Persian lamb-skins are used and are highly favoured now by the majority of fine Egyptian and Sea-Island spinners; at first they were only used on rovings and mules, but the results were so gratifying that, at the present time, Persian lamb-skins are used throughout in many mills, even on preparation and combing machine rollers.

The Expert's Advice. Considering that many mills are thousands of miles away from the tanner, it is naturally not possible for the manager to call in the expert, but there are certain rules regarding the choice of skins by which he may be guided. A well-known tanner gives the following advice to guide the spinning manager in purchasing:—

“It is a mistake to ask for a large-sized skin to be thin; skins are not grown thin on healthy sheep. If rendered thin by shaving, then the fibrous structure must suffer in strength.”

“In a lamb the fibrous structure is fine, thin, and delicate, and thus more suitable for the finer fibre with which it has

to deal, whereas on a sheep it is thick, coarse and rough."

" Skins should be used in consonance with the class of cotton and counts spun—for instance, in spinning hard twist of say 6's counts it would be ridiculous to choose a thin, smooth-grained skin; in this case a heavy roughish-grained skin would do the work quite well and would last much longer, besides being considerably cheaper."

" For low or coarse counts select a cheap quality of skin."

" For medium counts select a medium quality."

" For fine counts select only the best and finest, Persian lamb preferable, of small size and correspondingly fine grain."

" For drawing and slubbing frames—large, stout skins."

" For intermediate frames—medium size of medium substance."

" For Rovings, mules and rings—small-size skins of thin substance."

Rough and Ready Test. There is a rough and ready way of testing the average regularity of roller skins, viz.: by piling up a quantity one upon the other and noting the way in which they lie; if the pile should shew irregularity, *i.e.*, if it should be high in the centre with a decided tendency to slope off at the corners or in any one direction, this is a certain indication of consistent irregularity in the thickness of the skins. Nevertheless, it must not be expected that a pile of dozens of skins will be quite level at all points; it would not be desirable if it were possible; for this reason—

Equal Thickness Impossible. It is not feasible for the tanner to produce a true whole skin. The skin of an animal is always different in thickness and substance in various parts of the body. The thickest and toughest portion of a skin is the centre of the back, *i.e.*, from neck to tail; the thinnest and weakest portion is the belly; tensile tests from the various parts of the skin prove this. Now, if the tanner were to attempt

to render the whole skin equal in thickness by shaving, he would necessarily have to reduce the thickest and strongest portions down to the level of the thinnest and weakest, thus wasting valuable substance. Roller-skins may be trued up by the spinner in the course of covering the rollers; this is the only reasonable way and we treat upon the process on pages 31/33.

The Colour Question. Of late years much has been made of the colour question in regard to roller-skins. There has been a demand recently for black skins and many associate the fact of colour with the quality of skin. We

would say here that the question of colour does not in the least affect the quality of the leather. There are all colours to choose from, red, green, black, &c., but it is only a matter of individual selection; sometimes, however, a special shade is desired to distinguish some particular section of spinning. The tendency to use black skins may also be attributed to the fact that the 'ends' are more easily discernible than with a self-coloured skin.

Waterproof Leather. Much improvement has taken place of recent years in the manufacture of roller-leather, particularly in regard to the process of "waterproofing." It is a well-known fact that leather is very susceptible to the absorption of moisture, acting in this way like a sponge; makers have now succeeded in waterproofing roller-skins thereby reducing the tendency to "lick"; several specialized brands of this non-licking waterproof leather are now to be had.

A Last Word. As a last word on the subject of roller-leather we would recommend to the spinner the following axioms:

1. Purchase only really good skins, *i.e.*, the best of the grade necessary.
2. Trust your expert and let your working costs be a check upon the quality.
3. Avoid rejects; they have necessarily been 'rejected' for reasons; these same reasons are yours for their non-acceptance.

The Examination of Worn Rollers Preparatory to Covering.

Examination of Rollers. The importance of examining and classifying the worn rollers sent down from the mill to be re-covered cannot be over-estimated. The condition of these rollers is often a sure index to the state of the machinery to which the rollers belong. All rollers should be examined by a competent person in charge, whose duty it should be to classify them in three sections, viz.:—1, those which require re-covering with both cloth and leather; 2, with leather alone; 3, not re-covered at all but simply ground and varnished.

Channelling. Rollers with deep channelled grooves shew unmistakable effects of bad traversing of the yarn guides; probably the Traverse Motion is sticking; often, the traverse is not made to cover sufficient of the leather surface and hollowing quickly results; this is an indication, therefore, that a longer traverse could be employed with greater efficiency and economy.

Slack Mounting. It is only with worn rollers that one can trace the effect of covering the rollers with leather ‘hots’ a trifle too large in diameter; an abundance of slack leathers among the worn rollers will indicate the necessity of smaller “hots,” with consequently tighter mounting.

Roller Renovation. Again, many rollers are not worn sufficiently badly to require re-covering; these may be ground true and varnished on the special machine made for the purpose (see page 56). In some cases, rollers are returned somewhat indiscriminately by the operatives, many being sent for re-covering which do not require it. The unnecessary re-covering of these, can, with due examination, be prevented. This subject is dealt with on page 58.

Cloth

The condition of the cloth, in respect to its surface-

Condition. truth and 'cushion,' should also receive attention, taking note of the length of service of the cloth-cover. Some mills adopt a system of dating the new cloth-cover with a rubber stamp; we recommend this system, as, not only is it an indication of the age of the covering but also the quality of the cloth. At this stage too, the joints of the cloth-piecing should be examined to see if they have opened; if so they will cause a flat, soft place on the leather surface of the same width as the opening. Shrunk cloths of this description should be replaced, as they will always be a source of trouble by causing 'licking' and broken ends.



Preparations for Covering.

“Stripping.” Having determined upon the rollers which must be covered with new leather, it is now necessary to cut off the old leathers from these without spoiling the cloth-covering underneath. This is too often carelessly done with an ordinary stripping knife to the ruin of the cloth.

Old leathers should be cut off with the specially-made Stripping Appliance, No. 57, Fig. 1.

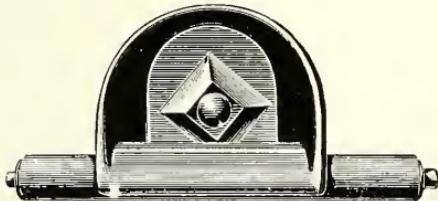


Fig. 1. Stripping Appliance, No. 57.
Codeword—“Cutoff.”

This contains a four-edged knife which may be set to such a depth as to cut just through the leather without injuring the cloth.

The appliance consists of a brass bracket, shaped to the hand, with a V base into which the knife point penetrates. The appliance may be used by hand, or it may be secured in a bench in an inverted position and the rollers passed through it.

“Scouring.” It is now necessary to test the rollers for cloth-condition, rejecting those of which the cushion is done, or of which the surface is badly hollowed by the traverse. These are best relieved of their cloths by placing them in a bucket of hot water to which soda has been added. When the cloths have peeled off, the rollers should be well scoured and all traces of old paste eliminated; to assist in this, a scrubber made of a piece of old card-clothing is very useful.

“Materials.” All materials used in the covering of draft rollers should be of the best—flour, glue, acids, &c., in fact, to attempt to save expense by employing anything but the best materials, the cost of which even in the largest mills being only

relatively small, is false economy. The best white flour makes the best paste, is the most tenacious, and is easier to use than the cheaper qualities. The same may be said of all other ingredients.

“Cleanliness.” The habit of cleanliness in the matter of machines and utensils is the first essential that the roller-coverer should acquire.

Great care should be taken to clean the machines and other appliances immediately after use—pasting machine, paste knives, mulling slabs, kettles, calendering machine plates, ending machine barrel, press bars, &c., &c. These are easily cleaned whilst the material is soft, but once allowed to get hard it becomes a laborious task to clean them properly.

Let us just take for example one machine—the Pasting Machine for the cloth; if the paste, which can be easily wiped off in the soft state, is allowed to remain until the next time the machine is required, it will have set hard and will be exceedingly difficult to eradicate from the corners; consequently, whilst working, small lumps will eventually detach themselves, mix with the good paste and choke up the thicknessing slot, thereby causing much inconvenience, loss of time and production.

The condition of the roller-coverers' tools and utensils is a fair index to the work accomplished.

Separate Department Essential. Roller-covering should not be performed in dirty precincts, but in a separate room, specially designed for the purpose, where the work can be done under the best conditions away from litter and dirt. The role played by leather rollers is sufficiently important to demand this.

Clothing.

Evil effects of tearing. Before dealing with the machine for this process, it would not be out of place here to say a word or two on a very frequent malpractice, *i.e.*, the *tearing* of the cloth into strips previous to the pasting process. The cloth should not be torn, but should be *cut* into strips with clean edges. The tearing has a bad effect upon the edges of the cloth for quite half an inch inwards; the web is disturbed, the strands being drawn out of position and elongated, and the edges are left raw and fluffy. The result is that, when mounted on the roller, the cloth gradually tapers at each end, and apart from the diminution of cushion effect, it will be seen that the full length of traverse cannot be utilized. The damage resulting varies with the length of roller; on single-thread mule bosses and rings, the proportion is very great.

Benefits of Cutting. By cutting the cloth, the strands composing the web are undisturbed, and the *exact* width required may be cut, thus saving the necessity of trimming the cloth edges and obviating another process. Scissors should be dispensed with. Thus the cloth when mounted on the roller forms a true surface; the edges, being square, lend themselves to the better bedding of the leather hot, and the roller may be ended more neatly.

This fact should be borne in mind, as with the most complete and up-to-date plant of machinery it will not be possible to have perfect rollers if the cloth is spoiled by the very first operation. Never tear the cloth; cut it on a cutting board by means of a sharp knife, or have it cut for you mechanically.

The best Adhesive. Many kinds of binding material have been used for securing cloth to the iron surfaces of the rollers, such as paste, glue, white-lead, cements of various kinds; but by far the best, and at the present day the most employed, is paste.

There are several reasons for this. What is wanted is a medium which will dry quickly and at the same time hold the cloth tenaciously; it should not set too hard, but should assist rather than diminish the "cushion" of the cloth; it should lend itself with facility to even spreading in a thin layer. Paste possesses all these advantages.

White-lead comes next in use, but is gradually being relinquished in favour of paste, as it possesses several disadvantages. White-lead is not sufficiently tenacious (owing to its slow drying properties) to hold the cloth in position whilst drying, and it is necessary to wrap the roller with yarn to keep the cloth bedded on the iron surface until the paint dries. Anyone who has watched this process will have remarked the great waste of time involved by the wrapping process. The Yarn also grooves the cloth surface.

With white-lead also the oil is rapidly absorbed into the cloth, which, as a natural consequence, shrinks and causes the joint to open. With paste as the medium these drawbacks are non-existent.

Roller Coverers' Paste. There are different ways of making roller-coverers' paste; but to give the best results paste should be of a nice even consistency, not too hard and yet not too soft; above all, it should be free from lumps. It is a mistake to make too much paste at one time; and when made it ought to be kept air-tight, or as nearly air-tight as possible, covered with a damp cloth. In commencing to use the paste, it is advisable to beat it up well on a mulling slab (glass or marble) before introducing it into the machine; by so doing not only is the paste got into more workable condition, but stray lumps may be discovered and eliminated.

Recipe for Paste. The following is a recipe we can recommend, having proved very satisfactory when used in the machine:—

1½ lbs. best White Flour.

½ gill boiled oil.

2 ounces Venice turpentine.

1 lb. amber resin.

Directions :—

1. Put the flour to steep in $3\frac{1}{2}$ gills of cold water for twenty-four hours before proceeding to make the paste.
2. Grind up the resin into powder ; place same in $3\frac{1}{2}$ gills of boiling water, and continue to boil for 25 minutes.
3. Then add the boiled oil and Venice turpentine, and continue to boil for another 5 minutes.
4. Now add $3\frac{1}{2}$ gills of boiling water to the flour and mix all ingredients together, stirring well until the whole has boiled for half-an-hour.

N.B.— Remove all lumps, large and small, as these are liable to choke up the slot of the machine which regulates the thickness of paste to be left upon the cloth.

The Pasting Operation. We now have to deal with the machine for this work, the Patent Pasting, Measuring and Cutting Machine, No. 33, Fig. 2.

The Pasting, Measuring and Cutting Machine has been invented to paste, measure off, and cut the roller cloth into pieces mechanically, more accurately and quicker than is possible by the old system of hand-pasting and cutting with a chisel.

First of all, the strip of cloth, which is in roll-form, A, is mounted on the spindle under the machine ; if too large in diameter, a pair of brackets may be screwed under the bench to carry the roll. The end of the strip is then passed through the slot behind the machine, through the paste-box and over the feed-roller, which deposits the cloth on the table under the knife.

The paste-box is then filled with paste : to accomplish this the top of the box is removable ; when in position this top or cover can be regulated by means of a screw to determine the thickness of paste upon the cloth as required. The edges of the cloth are protected and guided by side-plates.

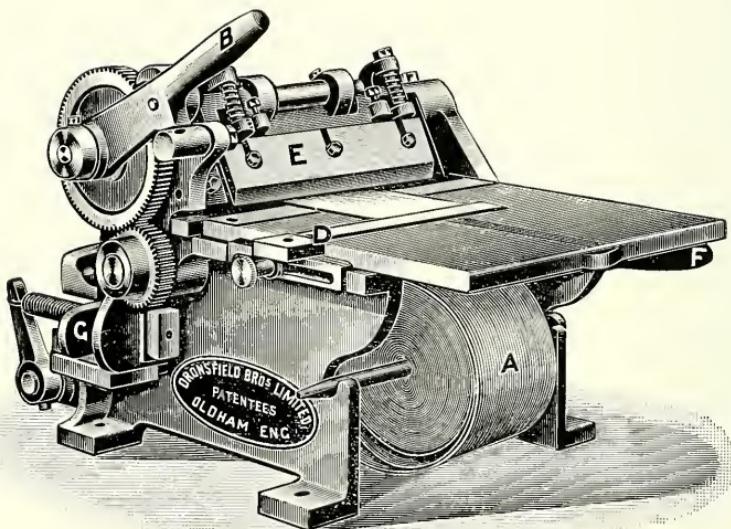


Fig. 2.
Patent Pasting, Measuring and Cutting Machine, No.33.
Code Word—"Clothier."

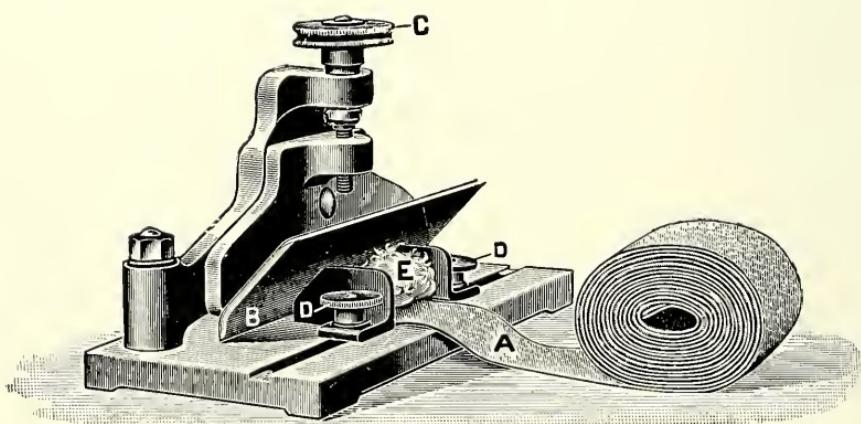


Fig. 3.
Improved Paste Spreader, No. 54.
Code Word—"Spread."

The machine is now ready for use. By pushing forward the handle B the cloth is advanced, ready pasted, along the table to an adjustable measuring plate, D.

The piece of cloth, thus pasted and measured, is cut off by pressing down lever F, which operates the knife.

Each piece is cut with a slight bevel, as the knife is set at an angle. The bevel forms an overlap, and is much preferable to a square cut joint, which cannot close up.

It will be seen that this operation only requires two movements: the combined pasting and measuring of the cloth by the left hand on the handle B, and cutting by the right hand on the lever F.

Fixing and Compressing. The prepared piece is then applied by the operator on the roller and the ends brought together by the fingers. Then the roller is passed to the Roller Cloth Compressor, No. 91, Fig. 4, to have the cloth firmly bedded by rolling.

The rollers having been compressed should then be stood up on end to allow the paste to dry, which is only a question of a few hours.

Multiple Operation. Several pieces may be pasted, measured and cut at the same time, by this means saving much time and labour.

For instance, where combers are used, for which say a 14-inch machine is necessary, about twelve single-thread boss cloths may be manipulated at the same time. The twelve rolls of cloth would simply be mounted side by side on the spindle and passed through the machine side by side exactly in the manner described, resulting in twelve pieces pasted and cut at each operation.

A simple Paste Spreader. For very small mills, where the number of rollers requiring to be clothed at any one time are few in number, the combined benefits of the foregoing machine would probably not be of the same service as to larger mills, but the pasting process is so important that it behoves every spinner to do this work mechanically and not by

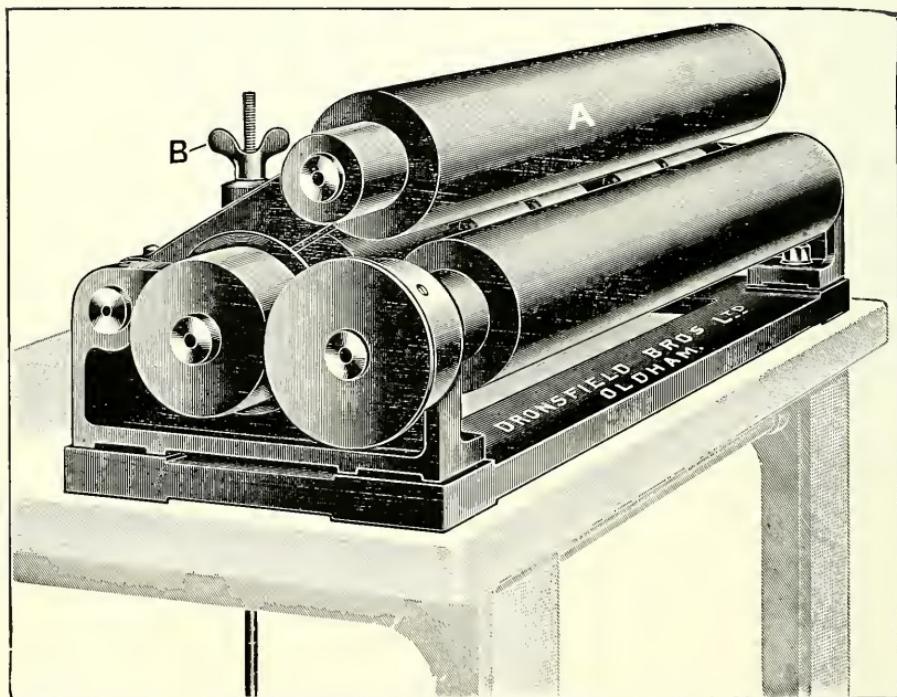


Fig. 4.
Roller Cloth Compressor, No 91.
Code Word—"Comprol."

hand. For the use of small mills we have designed the Improved Paste Spreader, No. 54, Fig. 3.

It is almost an impossibility to spread an even layer of paste upon cloth with a knife by hand; the result is bound to be uneven and the work slow.

The Paste Spreader illustrated in Fig. 3 is fitted with movable side-plates, D. for various widths of cloth, and a thickness regulator C. The cloth is first passed between the side-plates over the base and through the slot. The paste, E, is then deposited upon the cloth. The apparatus is now ready for use.

The operator takes hold of the end of cloth and draws it through the machine on the bench; the effect of this drawing is to thrust the mass of paste against the inclined plate B into the slot, thus allowing the paste to adhere to the cloth to the thickness permitted by the slot which, as we have previously stated may be regulated by the screw C. The length of cloth pasted at each draw is left to the discretion of the operator, bearing in mind that it is not wise to paste too much at one time owing to its liability to dry before the pasted piece is used up.

COMPRESSING THE CLOTH.

After the pasting operation, the cloth should be well bedded by rolling between true, prepared steel rollers under pressure. In the Roller Cloth Compressor, No. 91, Fig. 4, the top roll is made to rise and fall by means of a foot-lever.

Whilst the paste is in a moist condition, the rollers covered with cloth are placed between the two lower rolls, these being driven from the line-shaft. The upper pivoted roll is then allowed to fall gently into contact with the clothed rollers, the frictional contact causing the upper free roll to revolve. This rolling process closes the cloth-joint, eliminates blisters in the surface of the cloth, beds the same well upon the iron surface of the roller, and rolls down small particles of paste whilst soft, leaving the rollers in excellent condition for receiving the final covering of leather.

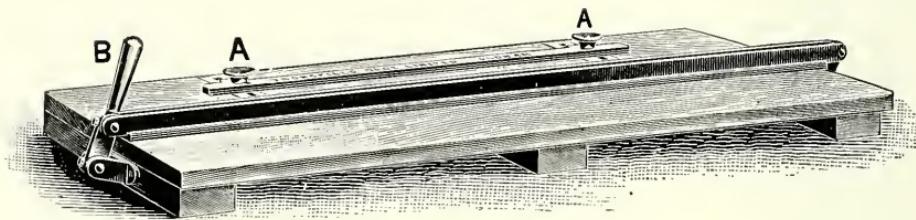


Fig. 5.
Improved Cutting-up Board, No. 34.
Code Word—"Skinstrip."

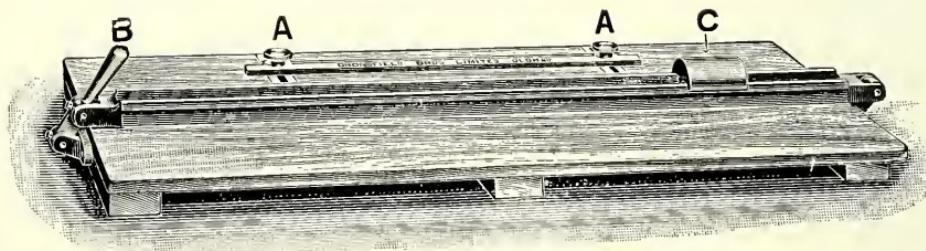


Fig. 6.
Improved Cutting-up Board, with slide carriage, No. 35.
Code Word—"Slidecut."

Partition of the Skins

No Slipshod Methods. We now proceed to deal with the manipulation of the leather and the manufacture of same into sheaths, or as they are termed in the trade, "hots." We shall describe each process of this manufacture, and we may here remark that, however simple any one of the processes may be, they must be carried out with the utmost care, or the result will not be as satisfactory as it might otherwise be. No slipshod methods should be allowed to enter into the work. Precision in the minutest detail is imperative; and if our instructions are carried out, we are certain the operator will be amply recompensed by the excellence of the results and the absence of complaints from the users.

Varying Substance and Fibre Growth. The first process is to cut up the skins into strips of the required widths, *i.e.*, the width of the roller plus a trifle at each end to allow for "ending," usually about one-eighth of an inch. Skins should never be cut across, but always from head to tail, the natural direction of fibre-growth. Different portions of the skin serve for the different kinds of rollers, *e.g.*, the centre of the back, which forms the stoutest substance, is used for drawing frame and comber rollers; on either side of same the skin is used for intermediate and roving, and the outside portions go to cover the mules and rings. This is the usual custom, and the outcome of many years experience and test in practice.

The Cutting-up Appliances. This cutting up of the skin into strips is performed with the aid of a specially constructed board, of which we make two kinds:—The Improved Cutting-up Board, No. 34, Fig. 5, with one straight edge bar, is for use with a hand-stripping knife.

The Improved Cutting-up Board, No. 35, with slide carriage shewn in Fig. 6 is fitted with two straight edge bars, on which

slides the knife carriage, carrying a two-edged knife to cut in both directions alternately.

The latter Cutting-up Board serves also for cutting up roller and clearer cloths, plush, &c.

Both boards are practically alike in their general construction : they are fitted with adjustable measuring stops—A,A ; the planed straight edges are made to rise and fall, both ends simultaneously, by the handle B, and are fitted close to a slot in the board for the knife to enter. Several skins may be cut up at the same time if required.



Equalizing the Skin-Strips.

True Whole Skins As already explained, it is impossible to obtain skins equal in thickness. In dealing with skins *Impossible.* at the tannery, no doubt the manufacturer strives to obtain the best possible results, but, as skin is grown and not manufactured, difficulties obtain which militate against its conversion into leather of even thickness. As the skin is of different thickness in different parts (particularly in the lower grades which exhibit great variation), it will be seen that to reduce the whole skin to one uniform thickness would unduly weaken the leather by reducing the strength of the stouter portions; not only this, the price would be of necessity advanced to compensate for the time and risk of the process.

Skins Trued Now, when the skins have been cut into strips, *in Strip form.* they have practically been classed into certain grades of thickness for the various kinds of rollers, and to true up each strip will not necessitate the grinding away of more leather than is required to leave it perfectly true in thickness.

It is of the utmost importance that the leather used in roller covering should be perfectly even in thickness, otherwise true rollers cannot result.

The Skin Truing Medium. The equalization of the leather ought, then, to take place at this stage, and for this purpose the Patent Roller Leather Grinding Machine, No. 36, Fig. 7, will be found to answer admirably.

No Waste. This machine grinds the leather in strip-form from the flesh side of the skin, *i.e.*, the furry or nappy side which exhibits the irregularity of thickness; by this means the thicker portions of the fibrous surface are ground away, leaving a strip of regular thickness throughout, without undue waste of strength or substance.

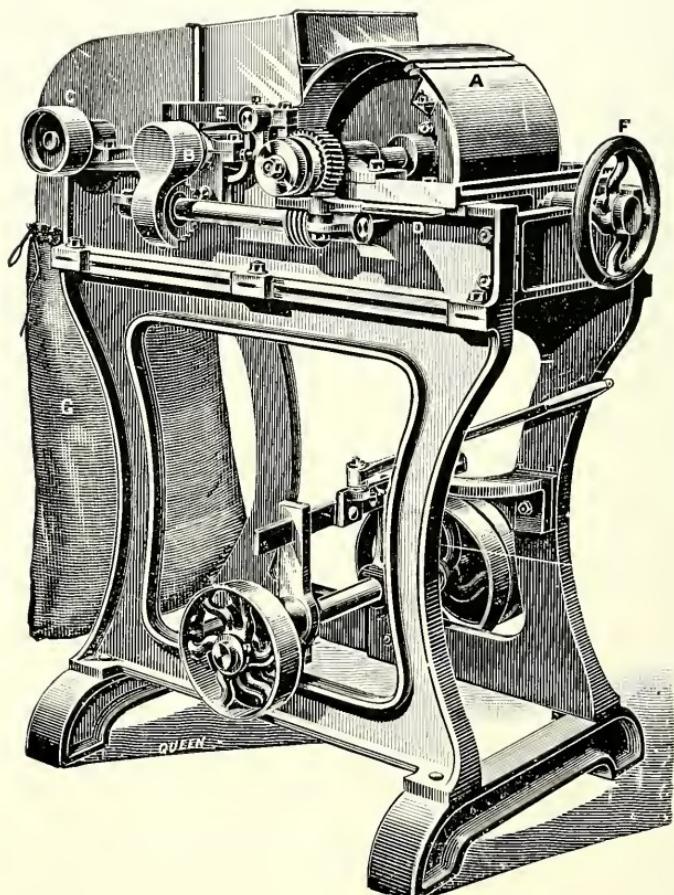


Fig. 7.
Patent Roller-Leather Grinding Machine, No. 36.
Code Word—"Equalizer."

Glaze not interfered with In this way, the glazed or hair side of the skin is not interfered with : this surface is undoubtedly the best drawing surface obtainable and should only be removed when it is found necessary to grind or varnish the rollers.

Working routine. The method of using the Patent Leather Grinding Machine is as follows :—

The end of the strip of leather is passed through the slot in the carrier-drum A and secured underneath by a thumb-screw which tightens a grip-bar ; the other end of the strip hangs down loosely over the drum. Behind the carrier-drum is situated the grinding-drum, which revolves at high speed ; this is covered with glass-coated filleting. Behind the grinding-drum is a fan actuated by the pulley C, which draws off the fibre ground from the leather and deposits it in the bag G.

The grinding-drum and fan are cased in ; the cover over the grinder is hinged to permit inspection of the grinding process.

The carrier-drum A is revolved slowly towards the grinder, the arm wheel F being used to set it into contact to give the necessary amount of cut ; before the leather comes into contact, any "buckling" is taken out by means of a presser-bar E, which keeps the strip tight on the drum surface.

When the strip has passed through its entire length, the carrier-drum may be stopped by the handle D, which throws the clutch gear out of action, without stopping the grinder ; by this means the leather may be examined or replaced without loss of time in continually stopping and starting the machine.

Direction of Fibre Growth. The strip should be mounted on the carrier-drum with the neck-end inserted in the clamp ; in this way the skin will run in the direction of the fibre-growth, permitting the grinder to operate upon the "pile" so as to produce a smooth, velvety finish.

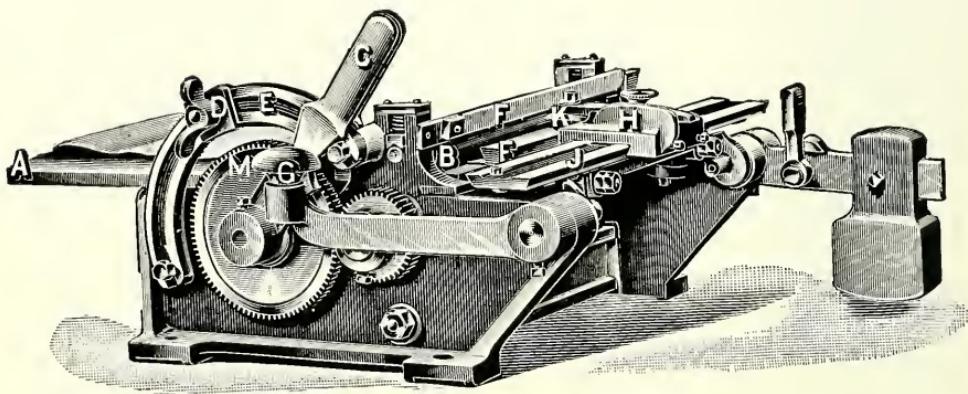


Fig. 8.
Patent Splicing Machine No. 37.
Code Word—"Beveller."

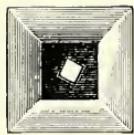


Fig. 9.
Four-edged Knife.

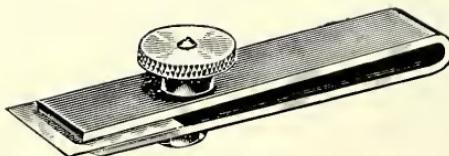


Fig. 10.
Knife Sharpening Holder.

Bevelling the Leather ("Splicing").

THE strips of leather having been ground to a uniform thickness, are now ready to be cut up into pieces of the requisite size, with bevelled edges. The operation is termed "splicing."

Important Process. This process is perhaps the most important in roller-covering and certainly the most difficult if done by hand. "Splicing" was for many years accomplished with the aid of a long cranked knife and a sheet of glass or marble slab. Since the introduction of our Patent Splicing Machine No. 37, with measuring arrangement, Fig. 8, hand-splicing is rapidly becoming obsolete.

Difficulties of Hand-Splicing. In cutting by hand many difficulties stand in the way of accurate work. An operative, however proficient, cannot use a long knife in such a way as to produce every bevel alike; there is a reason for this, apart from the impossibility of steadyng the hand whilst cutting; skin varies in hardness, and any roller-coverer will admit that to penetrate through the harder leather it is necessary to tilt the knife, which tilting means a different degree of bevel. A different degree of bevel means a different width of splicing. Further, a knife, say 12 in. long, cannot be maintained true from end to end, therefore a straight splicing cannot be cut.

Again, before the actual splicing operation takes place, the skin must be gauged, *i.e.*, calipered. This also must be done by hand, and is frequently so carelessly done that pieces of irregular length result.

Simultaneous Measuring and Cutting. The Patent Splicing Machine comprises, in addition to its cutting properties, a measuring arrangement; the two processes of measuring and cutting are exceedingly simple. The method of using the machine is so extremely easy that the most inexperienced person can cut faultless splicings after a few minutes' practice.

Manipulation. In commencing, it is necessary to set the measuring stop D to the required distance; this stop is held by a thumb-screw on the measuring scale E. The leather, which should be cut with the glazed side down, is then measured through by gripping and drawing simultaneously the handle C up to the measuring stop. The leather is then held by pushing down with the left hand the lever G, whilst the cut is made by drawing the carriage H, which carries the knife K, along the slide with the right hand. The weighted lever brings the slide back into position ready for the next cut.

Labour Saving Knife. The knife is square, with four hollow-ground edges, which may be used alternately until all four require sharpening; a special holder for sharpening the knife is sent with the machine.

In sharpening, care should be taken to keep the knife square.

Knife Setting. The knife, when cutting, slides on a glass plate set in a brass bed, and to ensure the complete penetration of the knife edge through the leather an adjusting spring is employed. This spring is fixed in the knife holder, and by tightening or slackening same, the knife is raised or lowered accordingly. When commencing to use the machine, the knife should be set by this means until it just touches the glass when the leather is in position for cutting.

Angle of Bevel. The question of angle of bevel is an important one, the more acute the angle the wider the bevel given to the leather. The bevel should not be too wide nor yet too narrow; in the former case, a wide hard line caused by the cement will be introduced into the finished "hot"; in the latter case, the piecing will probably burst open.

After much experimenting we have concluded that for sheep skins of any grade a 12 degree angle is the best, and for calf skins 15 degrees; these angles give a bevel of medium width, quite wide enough to form a good joint without any possibility of bursting open.

Every Bevel Alike. The Patent Splicing Machine cuts every bevel alike; in fact it must do so, as the knife-carriage slides along the bed, fixed at the above-mentioned angle when the cutting operation is taking place; were the slide not so fixed the knife would not penetrate. Equal bevels are absolutely essential to true rollers. To illustrate the evil of unequal bevels we show two sketches, Fig. 11. The upper depicts two bevels of unequal angles; in this it will be easily seen that when the two are joined together one will overlap the other and cause a lumpy piecing. The lower sketch shows two equal bevels of equal width, from which a perfect joint will result.

Pairing Bosses. With double-boss rollers the leather should be cut up into strips wide enough to cover both bosses; these strips should be cut and pieced as single "hots," and the hots then cut into two, one for each boss. By so doing, the same are kept in pairs, matching each other in thickness, and in tensile strength.

Direction Arrows. The bevelled pieces should be marked after the splicing operation and before piecing, with a small arrow to indicate the direction of the joint, so that the operatives may place the rollers correctly in the machines to run with the bevel and not against it, as might otherwise easily happen.

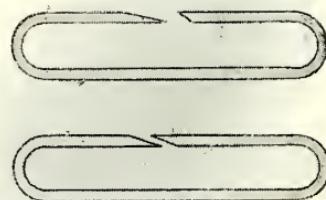


Fig. 11. Bevels—good and bad.

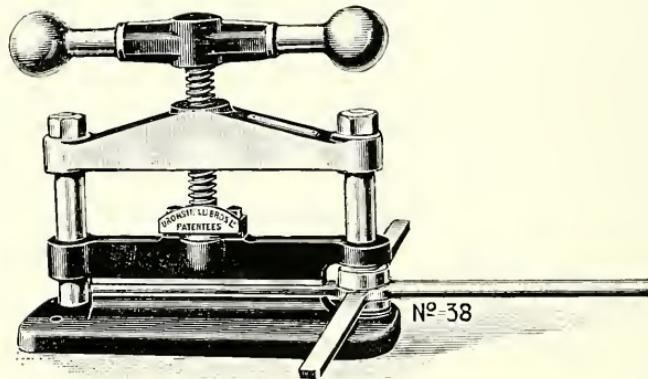


Fig. 12. Patent Screw Press with Turntable, No. 38.
Code Word—"Turnstile."

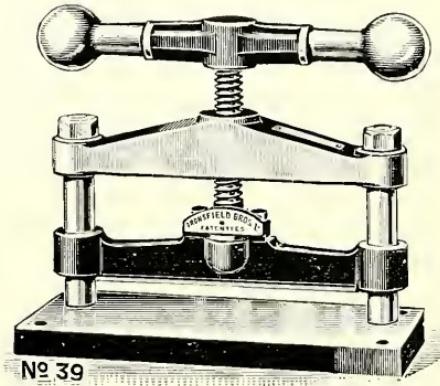
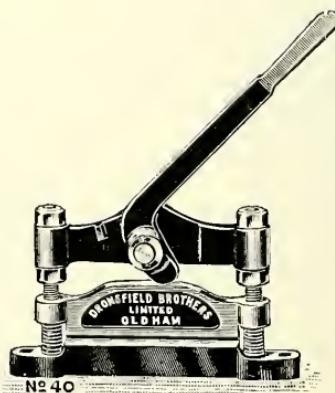


Fig. 13. Screw Press, No. 39.
Code Word—"Cementer."

Fig. 14. Lever Press, No. 40.
Code Word—"Leverage."



Piecing.

Careless Piecing and Waste. The bevelled pieces are now ready to form into tubes, or, as they are termed in the trade, "hots." This is in appearance a very simple process, but we would like to see greater care exercised generally in this work. Many hots are ruined by bad piecing, and we believe more waste occurs from this fault than from any other of the re-covering processes. How often one sees hot after hot burst during the mounting process through bad piecing; and this is all waste.

Primitive Piecing Methods. There are yet to be found primitive methods of piecing; one is in the form of an iron bar resting on a wood frame, known as the piecing horse. Upon this the leathers are cemented and a two-handled roller is brought into action, the operator rolling same backward and forward upon the piecing from end to end. This system is tediously slow, and if the operator should happen to apply the roller somewhat askew and not in a direct line with the piecing, the top bevel of the joint frequently slips off the lower bevel; this necessitates a repetition of the whole process, with the disadvantage of having finally an unsatisfactory and messy job.

Types of Presses. The presses in general use to-day are of three kinds (see Figs. 12, 13, 14).

- No. 38 is our Patent Screw Press with Turntable.
- No. 39 Screw Press without Turntable.
- No. 40 Lever Press.

In No. 38 the turntable has been introduced and largely adopted with a view to prevent the leathers sticking together inside while under pressure. There are four arms to the turntable; one is always in front of the operator, who may be preparing the hots on the arm whilst the preceding hots are under pressure. The turntable is so made that, whilst revolving on its core, the arms

rise until they have arrived immediately under the pressure bar, at which point they fall; this is arranged so that the hots carried on the entering bar do not strike the base of the press, and hence are not disarranged.

No. 39 is a Screw Press without turntable; in this case the leather hots are introduced immediately under the presser bar, without the aid of the turntable.

No. 40 is a Lever Press, the top pressure bar of which is put in and out of action by means of an eccentric lever.

With the Presses No. 39 and 40, there is always present the risk of the Cement being forced into the interior of the tube, causing same to stick together inside, and rendering it necessary to open out the 'hot' with a wedge-shaped stick. The necessity for this is obviated in the No. 38 Press with turntable-bars.

Cement Recipes. In the first place, good cement is indispensable; this may be composed of the following:—

Isinglass or Gelatine, either, or both in equal quantities; dissolve by Acetic Acid.

Special Cement for Waterproof Leather.

1 oz. Best Russian Isinglass.

$\frac{1}{2}$ oz. Gum Acacia.

4 oz. Acetic Acid, 40% strength.

In hot weather add a little more Isinglass as required.

It is a mistake to use too much cement; if of proper consistency, a minute quantity ought to suffice. An over-large quantity runs off the bevels and into the fibre on the flesh side of the skin, clogging it and causing a hard line on the surface of the roller.

Mounting the "Hots."

WHEN the hots are dry they are ready for mounting on the cloth-covered rollers ; this again, is a process which should be managed with care, as much depends on the manner in which the mounting is effected. Undue stretching of the leather, and consequent irregularity in diameter of the finished roller, is an evil which might frequently be prevented by proper attention to the springs and the manner of applying the hot.

Springs. Springs should not be too long, or there will be difficulty in drawing away the wires of the spring from the hot after the latter is mounted.

Nor should the springs be too short, as in this case the friction of the leather with the cloth-covering will create undue strain upon that portion of the hot unsupported by wires.

The spring is intended as a guide for the hot ; the wires of the spring should be as thin as is practically possible ; and should be so fixed that, when opened out by the roller inside, they should lie quite evenly on the surface of the roller without overlapping ; when the wires become twisted, the spring should be overhauled. The overlapping of the wires inside the leather causes irredeemable damage.

Length of Wires. The spring-wires should be of such a length that they will cover about three-fourths of the roller ; this will give the spring sufficient power to guide the hot fully on to the roller, and at the same time leave sufficient leather unsupported by the wires for the operator to grasp when it is necessary to withdraw the spring.

The Solderless Spring. The spring is the vital basis of all types of pulling-on machines ; the most perfect machine cannot do work if fitted with a bad spring.

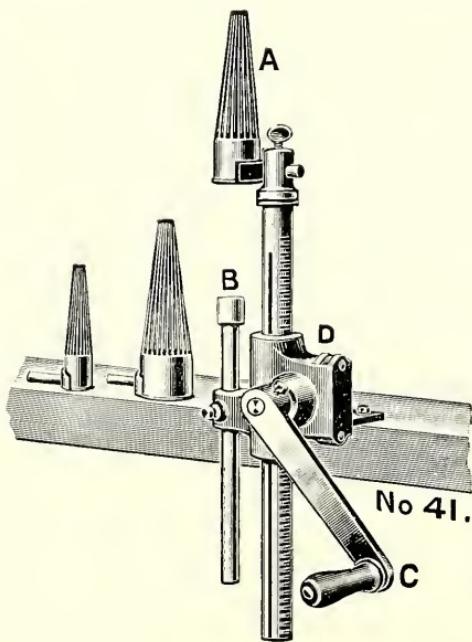
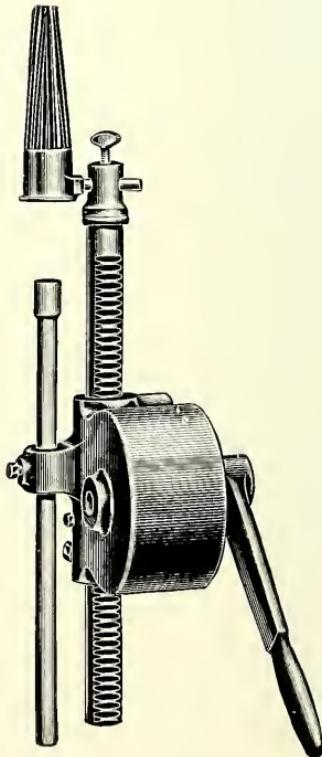


Fig. 16.
Improved Pulling-on Machine,
No. 41.
Code Word—"Forcer."

Fig. 17
Vertical 'Quick-Action' Pulling-on Machine,
No. 43.
Code Word—"Rapid."



For many years there was not much departure from the type of spring originally adopted, but recently we invented the Patent "Solderless" Spring, Fig. 15, which as its name applies requires no solder in its construction. When a wire breaks, it is simply necessary to unscrew the binding cap A, take out the broken wire and replace with a new one. The cap is made in various forms to suit the different types of machines but, apart from the cap, every other part of the spring is standardized. A prominent feature of this spring is the fact that full resilience of the wire from base to point is gained through the elimination of solder upon the ferrule. Fig. 15 illustrates the solderless spring complete and in Parts.

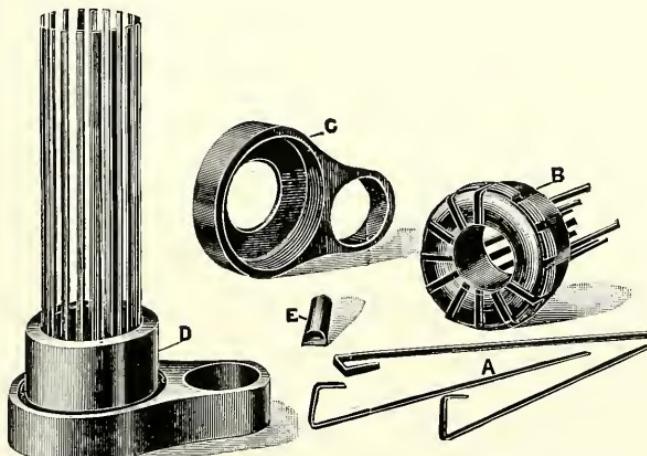


Fig. 15. Patent "Solderless" Spring. Complete and Dissected.

Foot-rope The old method of drawing the hots on with the *obsolete*. aid of rope and foot is now obsolete and very few indeed continue it. It was a bad practice, tending to much damage of the leather and uneven stretching.

Types of Pulling-on Machines. There are now in general use four types of pulling-on machines (all of these may be fitted with 'solderless' springs if desired). Fig. 16 illustrates the Improved Pulling-on Machine, No. 41 of well-known type, fitted with single rack and pinion; this machine

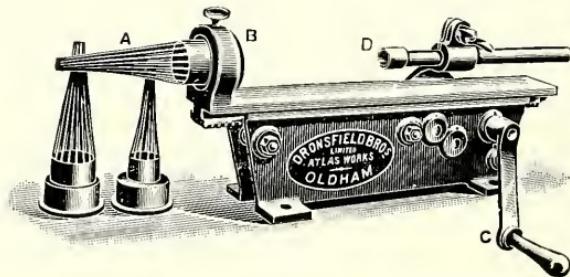


Fig. 18.
Double-purchase Horizontal Pulling-on Machine, No. 42.
Code Word—"Horiforce."

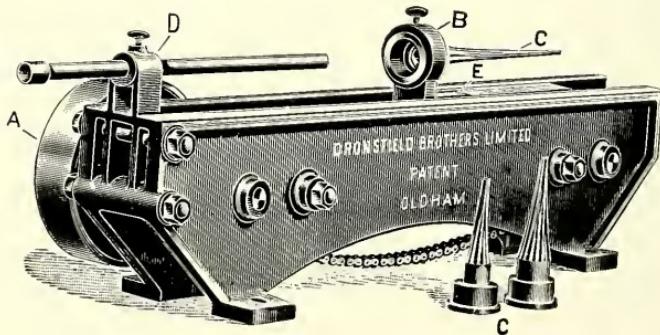


Fig. 19.
Patent Power Pulling-on Machine, No. 44.
Code Word—"Powerful."

may be used for all the smaller rollers in the mill, but for large drawings and combers, &c., we advise one more powerful (read following text).

Method of Working. The method of working all the pulling-on machines is substantially the same; the hot or leather tube is placed over the spring-wires A, (fig. 16), the roller is pivoted in the fulcrum stud B; then, by turning the handle C, whilst holding the hot upon the spring with the left hand, the hot is gently opened out as it is drawn over the roller; when the hot has arrived in position, the top portion of leather unsupported by wires is then held with the thumb and first finger and the spring withdrawn by further turning.

Fig. 17 illustrates the latest vertical 'Quick-Action' Pulling-on Machine No. 43, specially designed to cover mule and ring-frame rollers. As its name implies, the action of this machine with short stroke lever accelerating-gear renders the work of mounting the hots more rapid than with the rotary handle machines.

This machine has been widely adopted by the larger mills who possess a large number of these small rollers. We do not advise it for rollers with long bosses and large diameters.

Fig. 18. Horizontal Double-purchase Pulling-on Machine, No. 42; a powerful machine for all types of rollers.

Fig. 19. Patent Power Pulling-on Machine, No. 44. This machine will accommodate all types of rollers, but it is expressly made for covering comber rollers, drawings, derby doublers, and all rollers with long bosses and with large diameters.

Power Machine; The Patent Power Pulling-on Machine, No. 44, is of totally different construction to the hand machines.
Method of Working. In place of a rack and pinion actuated by a handle, we have introduced a train of steel gearing driven by a belt from the line-shaft; through this gearing a chain receives its motion; this chain takes the place of the usual

rack. The carriage E, which carries the spring C, is put into action by means of a trigger, which engages with the chain and carries the spring with the 'hot' over the roller, leaving both hands of the operator free to guide the hot to its position upon the roller. At the end of the traverse, the trigger is mechanically disengaged, and the carriage is again free to be slidden back by hand to the starting point. By this means there is no winding back of the carriage, and time is saved; as the strain on the leather hots is uniform, and free from jerk or strain, there is less waste in bursting of leathers.

Uniform Draw. The great feature to be regarded in the mounting process is uniformity of draw; no jerking of the handle should be permitted should the hot be extra tight; if jerking has to be resorted to, it may be taken for granted that the machine is not powerful enough, and a more powerful machine should be procured.

Ending Margin. Care should be taken not to leave too much margin of leather over the ends of the roller for ending purposes; this can be easily prevented. Trimming with scissors will also be avoided by a little care in the cutting-up process. The ends should also not be too short; if so, there will not be sufficient margin to completely shield the ends of the cloth, to the detriment of the latter through the penetration of oil; licking will also be caused by the protruding of the raw ends of the leather and the imperfect bedding of the leather upon the roller.

ENDING.

TH E Rollers, having been covered with the leather hots, as described, are now ready for the ending process, *i.e.*, the portion of leather protruding over each end must be turned down in order to prevent the hot slipping during its work, and also to shield the cloth foundation from the penetration of oil.

Old Burning Method. In the old days this operation was performed with the aid of heated irons, but this primitive and very unsatisfactory method has long been obsolete, having been replaced by various types of machines upon which the ending is done by friction.

It is often asked "Why are the leather tubes called 'hots'?" It is interesting to know the derivation of the term and we believe that it arose from the system of burning the ends down by hot irons in the old days. It was a common question for the roller-coverer to ask his assistant if the "hots" were ready, *i.e.*, the rollers of which the leathers had been drawn on ready for the hot irons, or burning process.

The Ending Tool. The ending tool is most frequently of boxwood, but leather, bone, and other materials are used at the discretion of the coverer.

The Ending Machine. The type of machine now most frequently demanded is the Patent Roller Ending Machine, No. 45, Fig. 20. This is here shewn with a fan, but may be had with or without fan as desired. The fan is a useful adjunct, serving not only to remove the fumes and dirt caused by the burning of the leather through friction, but also as a ventilator for the room.

The machine consists of a polished cylinder A, balanced for high speed, to be run at 700-800 revolutions per minute. At the back of the cylinder is fitted a slide carrying arms B B, in which

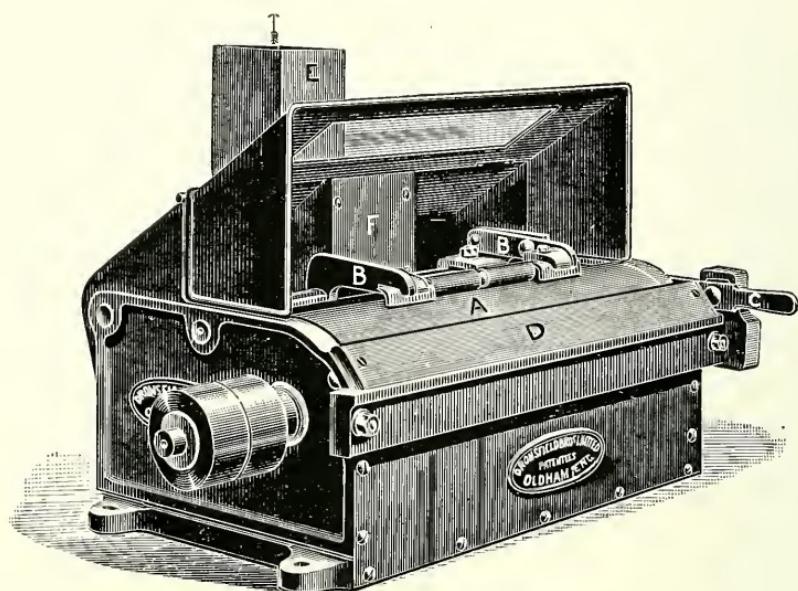


Fig. 20. Patent Roller Ending Machine, with Fan, No. 45.
Code Word—"Friction."

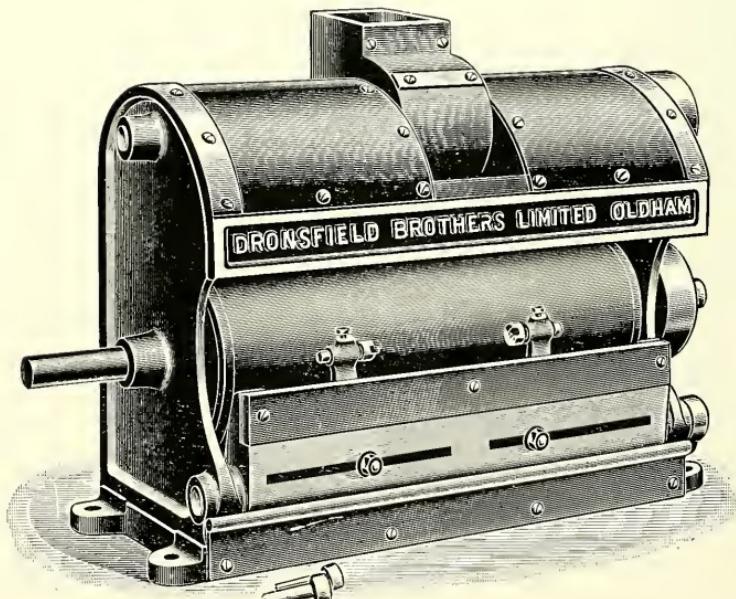


Fig. 21. Patent Roller Ending Machine, with Fan, No. 47
Code Word—"Ender."

are held brass steps for the rollers to revolve in. When worn thin, the thin part of the step may be cut away and the step moved up, in this way permitting same to be used again and again until too short to fix in the brackets. The steps are raised and lowered by the weighted lever C, putting pressure upon the roller to cause frictional contact with the cylinder. The fan is fitted in the centre behind the machine, and is driven from the cylinder shaft. The fan mouth E, is movable so as to facilitate the fixing of the ventilating pipe in any desired position.

Another Type. Another type of Roller Ending Machine is the No. 47, shown in Fig. 21.

This also possesses the friction cylinder and the fan; the fan in this case is fixed over the cylinder. The ending is done in the same way as on the previously described machine, but the roller is held in steps of quite a different kind. The steps are placed in front of the cylinder and fixed to the handrail; this handrail, with the steps carrying the roller, is moved forward by pressure in the act of ending. When the hands are taken from the rail, it falls back from the cylinder, leaving the roller out of contact.

For Heavy Rollers. This system has been designed to meet the requirements of Coverers who prefer to have the roller stopped when inserting or removing same. This machine is preferred by many who have occasion to deal with rollers of large diameter and great length, such as derby-doubling and double-boss drawings, the weight of which makes it difficult to manipulate them with one hand.

Careful Ending urged. Much depends on the manner in which the ending operation is performed. Rollers may be completely spoiled with careless ending. The operator should be careful to apply the ending tool immediately over the edge of the cloth and work outwards with a downward pressure; if the tool engages with the loose leather first, a buckled or creased ending will result.

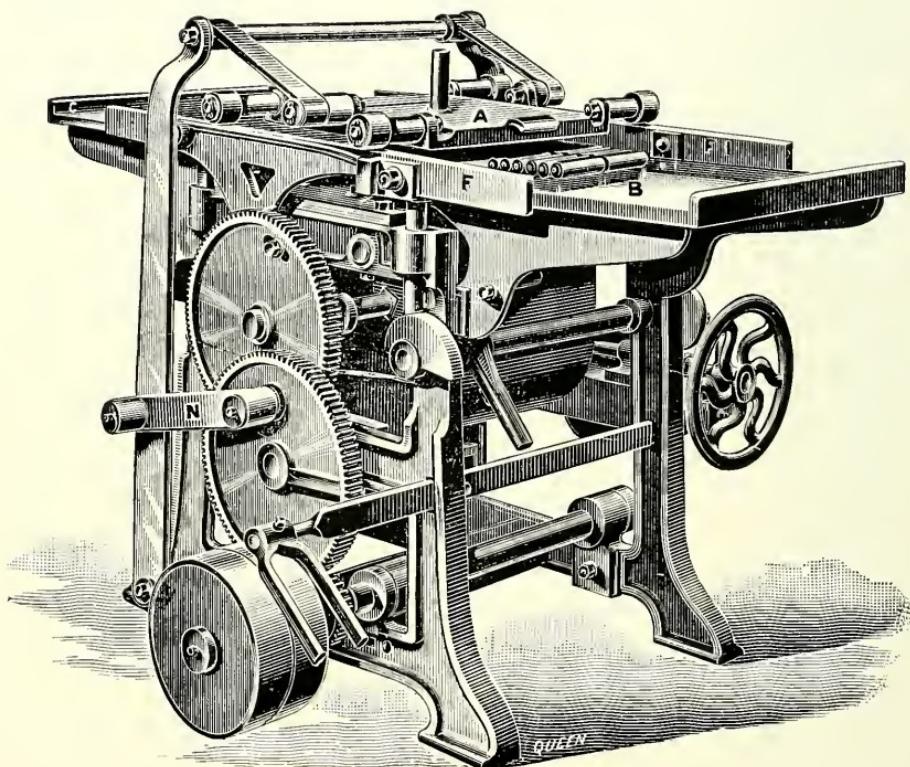


Fig. 22.
Patent Roller Calender No. 48.
Code Word—"Finisher."

Calendering.

THE ending operation completes the actual covering of the roller, but there is yet another process for the rollers to go through before putting them into work, namely "Calendering" i.e., mechanical rolling between hot surface plates. This operation is performed by means of the Patent Roller Calender, No. 48, Fig. 22.

Reasons for Calendering. This process is without question indispensable for various reasons; the rollers are improved in many ways, as we shall describe.

The roller skin passes through many stages, as we have explained in the foregoing chapters, and it will be easily recognised that the leather is bound to receive a certain amount of damage even in the hands of the most careful.

Hard Flat Joints. In the piecing process, the cementing of the joint causes a hard line as wide as the joint itself, from end to end of the hot; accompanied with this hardness is a certain amount of flatness, which is apparent, although not to so large a degree, on the roller surface after the drawing-on process.

Scaly Surfaces. In mounting the hot, it is necessary to pull the leather on as tight as possible, to prevent slipping, and although the "gauge" of length may have been so arranged to allow for stretching without damaging the skin-surface, yet the variation of the nature of leather will cause many to receive a certain amount of damage through stretching. If the surface of Roller Leather be examined through a microscope, it will be seen that it is of a "veined" nature, the veins standing out quite distinct from the porous tissue and varying in size according to the quality of the skin. In mounting the hot, if too much tension be exerted upon the leather, this veined surface

will burst open, leaving a scaly appearance, which although almost invisible to the eye, is perceptible to the feel, and makes its presence felt when put to work. This is the cause of the rejection by the mill-operatives of many newly-covered rollers, owing to the inability of the said rollers to "start up" without licking.

Buckled Ends. Frequently the pressure of the ending tool causes the leather at the ends to rise up or blister, as previously explained, thus leaving the ends of the rollers higher than the centre.

The Remedy. Now, by rolling between hot surface plates, these defects may be rectified; the calendering process renders the rollers perfectly smooth, softens and rounds the hard joint, rolls down the scaly particles and the blistered ends.

Moisture. In addition to these defects the moisture absorbed by the leather (a great evil in spinning rollers) is dried out; leather is much like a sponge and absorbs moisture very quickly.

A Homely Simile. To use a homely illustration, the hot rolling plates act upon the rollers in a similar way to the glossing iron upon linen in the laundry. The plates are not in contact long enough, nor in reality are they hot enough, to scorch the leather, but just long enough to put on the gloss and roll out the irregularities.

Labour Saved. The roller, when in the calender, is never at rest on the heated plate, but performs a constant rolling motion from start to finish. At one time, this calendering used to be performed with the aid of a steam chest and a hand rolling plate, but most of them have been replaced with this automatic machine, which, besides being safer and better in every way, saves much laborious work.

Not a "Cure-all." It must not be thought for a moment that this machine is an absolute cure-all for bad work. It is not; it is

simply a means of improving the rollers by remedying defects which occur no matter how careful the operator may be.

Nor will it make a roller true which has been covered with an irregular, *i.e.*, thick and thin skin. It will not make a thick skin thin; this equalization of the skin must be done previous to making the hot. (See previous article, "Equalizing Skins").

Economy and Efficiency. The Patent Roller Calender has during the past few years been widely adopted for the purpose of improving the working condition of the roller-surfaces periodically, thereby increasing the life of the leather and removing causes of faulty working, beyond the ability of the operatives to overcome. The spinners adopting this method of periodical calendering claim to have gained very great benefits. As the speed of calendering is approximately 400 rollers per hour, it will be seen that the frame or mule need only be stopped a short time to permit of the removal, calendering, and replacement of the rollers. Rollers which have become somewhat abraded or of which the harsh parts of veined surface have burst or sprung are much improved by re-calendering. We have it on record that the system of calendering partly-worn rollers, apart from their superior working efficiency, has resulted in a saving of one-third of the annual cost of roller-covering.

Waxy Surfaces and Calendering. There is much to be said in favour of this periodical calendering. Many spinners do not like to take out rollers even for replacement by newly covered ones, and base their objection on the fact that the rollers have got "bedded down" to their work although they may have become hollowed by the passage of the sliver, and accept the fact that they are not drawing as evenly as they ought.

Just as there must be a reason for everything, and this fact not being an exception, we have gone to some trouble to find the reason for this preference on the spinners' part for rollers which have worked some time, and we have come to the conclusion

that it is on account of the surface of leather having accumulated a thin film of wax from contact with the cotton fibre, which, in our opinion, accounts for the mellow appearance of the leather after a few weeks working. This waxy coating is of great value in assisting the smooth passage of the sliver and by re-calendering the rollers between the hot surface-plates of the machine this wax is warmed and distributed, and forced into the pores of the leather, giving a most desirable surface.

Renovation of partly-worn Rollers. When calendering partly-worn rollers taken out of the machinery, it is advisable to clean the surfaces of these with a cloth to remove accumulated fly and thick grease spots. A rub or two with a petrol-soaked cloth will free the objectionable particles, but it is not advisable to "scour" the surface of leather, as the retention of the wax film already mentioned is much to be desired.

Construction. The Patent Roller Calender is adapted for heating with Steam, Gas, Oil, or Electricity, as desired. The steam heating, being so generally used is the medium most demanded. The steam chest is fitted with inlet and outlet taps, and a tap for drawing off the hot water, *i.e.*, condensed steam. (This hot water is very useful in the roller-covering shop, serving for roller-cleaning and scouring purposes).

The top of the steam chest is planed perfectly true, and polished to form the surface plate; over this is fixed a rolling plate A, mounted on bowls to run on the rails F F, and worked to and fro by the cranks N.

Manipulation. Before commencing to use the machine, put the two plates in contact, so that both may be heated; after use, again put the plates in contact to preserve the surfaces from the penetration of dust and damp.

To set the machine, first lift up the top Rolling Plate A, insert a roller on the front edge of the surface plate and let the rolling

plate rest upon it; then turn the arm-wheel until the bowls are just out of contact with the rails F F, say $\frac{1}{32}$ of an inch.

The rollers are placed on the receiving table B, and each roller in turn is fed automatically on to the surface plate, rolled several times backward and forward, then deposited on to the delivery table C, another roller being immediately taken in by the feed motion. Thus, after the machine is set to calender rollers of the required diameter, it may be left to do its work, all the actions being automatic.



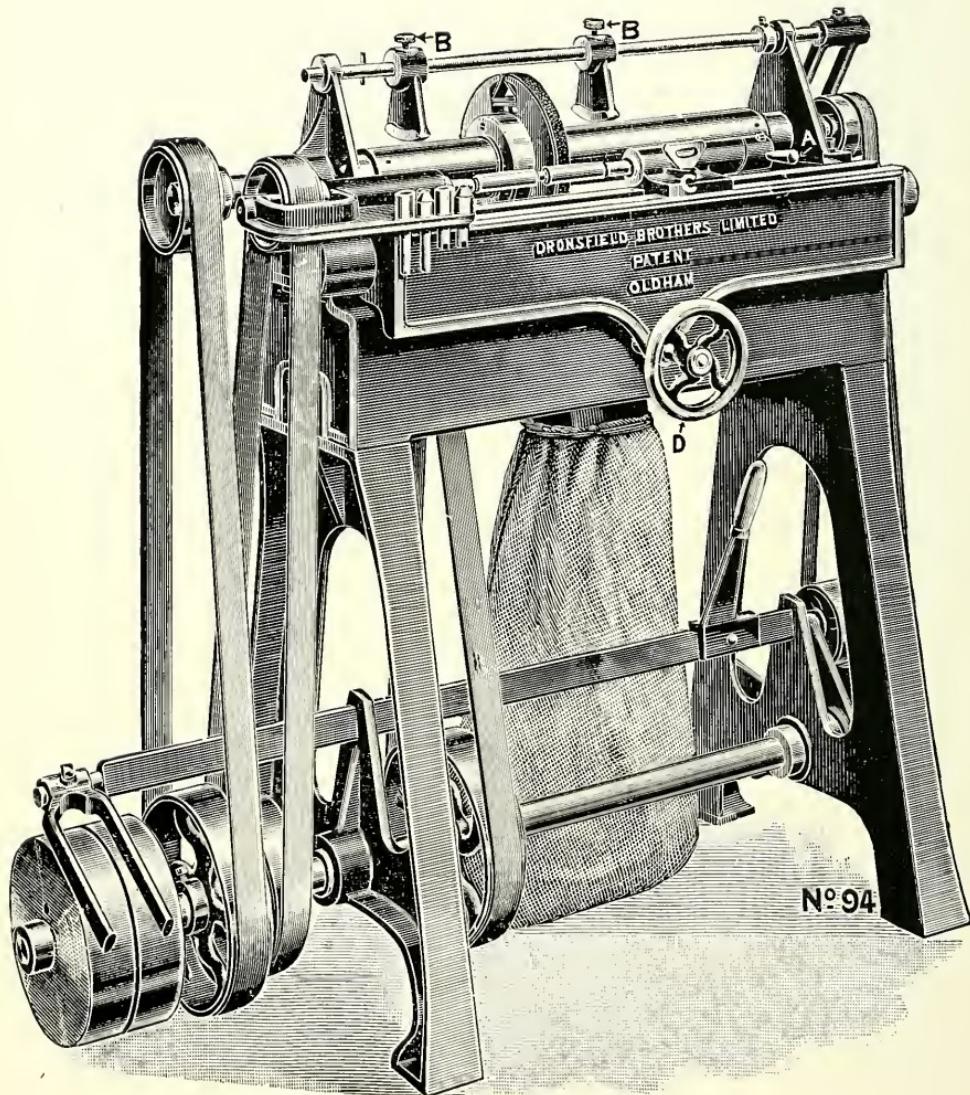


Fig. 23.
Patent Grinding Lathe, No. 94.
Code Word—"Accuracy."

Grinding and Varnishing.

For all Types of Rollers. IT is well known that all Combing Machine rollers have to be ground and varnished in the first instance, and again periodically during the lifetime of the leather, and for this purpose the Patent Grinding Lathe No. 94, Fig. 23, has been long used, but up to recently few spinners attached importance to the fact that all classes of rollers may be ground and varnished in this manner and put into workable condition without re-covering with new leather.

Such, however, is the case, and at the present time hundreds of these machines are being used for grinding all kinds of rollers, cardroom and spinning rollers alike.

Careless Varnishing and Leather Ruination. At present the varnishing of the rollers of drawing frames and preparation machines is done by many in a very primitive and often slovenly manner ; no attempt is made to take off the old varnish, which accumulates, coat upon coat, until the varnished surface becomes so hard that the resiliency or "cushion" effect of the cloth foundation is neutralized, and in fact the cloth might just as well be absent ; not only this, but the accumulated varnish cracks, and the roller, after having done indifferent work since its introduction, is sent to be re-covered, to have all the care and attention paid to it by the roller coverer in the application of a new leather, in order that it may be instantly ruined in the hands of a careless operative, who is, in this case, however, only an item of a careless system.

Importance of Grinding and Varnishing. The varnishing of rollers is a very important matter and should be treated as such. A responsible person should be appointed to do all the varnishing of rollers, likewise the grinding. Rollers should never be re-varnished until the old varnish and irregular surface of leather has been ground, leaving the surfaces true. There is a further reason for grinding the old surface,

varnished or otherwise. The waxy covering of the cotton fibres gradually coats the surfaces of all leather rollers; if this film of wax is not removed by grinding or sand-papering the varnish will not adhere, and will peel and fall away during work. Machine-grinding is naturally better and truer than any roughening by hand, but all rollers should be ground before varnishing, even if they have been varnished previously.

The varnish should be applied either with a flat hog-hair brush or a cloth rubber, whilst the roller is revolving, so that the varnish may be well ingrained; two coats may be found necessary. The thinner the application of varnish the better, as varnishing is only the means of replacing the glaze upon the leather which has been removed by grinding.

Recipe for Varnish. The following recipe for roller varnish is recommended:—

1 lb. chrome yellow.	$\frac{1}{4}$ lb. rouge.
$\frac{1}{4}$ lb. lamp black.	10 ozs. joiners' glue.

1. Place altogether the chrome yellow, lamp black, and rouge, and pound well into powder.
2. Boil the joiners' glue in two quarts of water, add in the above mixed powder, and let it simmer for half an hour, continually stirring it.
3. If same should be thicker than ordinary paint dilute with warm water and then bottle.

N.B.—Before using it will be necessary to heat the varnish slightly to render it liquid.

Why are Rollers Re-covered? Now reverting to the re-covering with leather of rollers of all kinds, we may ask the question: Why are rollers re-covered? The answer will be for the most part "because they wear hollow and are no longer capable of drawing evenly"; but even this is

not a sufficient reason for re-covering with new leather. Is the hollowed leather done? No, it is simply irregular. Then, if not too far worn, it will work if it can be made true.

Re-covering This truing may be performed by the Patent often Grinding Lathe illustrated. As a proof that this is a *Unnecessary* feasible system, we may here state that in many mills mule and ring frame rollers which have been so treated on this machine are now lasting months longer, and the roller-covering bill is reduced to a proportionate extent.

We do not infer that all rollers may be thus treated. Some require new cloths, others are badly grooved by the use of an indifferent traverse motion causing "hollowing and channelling", others have probably worked slack, but the majority not previously treated will be found on examination sufficiently good to enable them to be ground and varnished and put back into work.

Manipulation. The Patent Grinding Lathe is easy to manipulate. The rollers to be ground are inserted in chucks, which run in ball bearings; the right-hand chuck is mounted in a carriage, C, which may be set to any required distance for various lengths of rollers; the carriage is fixed on a slide by means of a thumbscrew. The chuck itself is receded by a thumb lever, so that the roller may be placed in position in an instant; the chucks are self-centring. The length of traverse, which of course must agree with the length of the roller being ground, is determined by the position of the stops B B, which are mounted on the top reversing bar; as the grinding wheel comes alternately into contact with these stops the direction of traverse is reversed. The grinding wheel is covered with a specially made glass-coated fillet, which, when worn, may be replaced in a few minutes by the operator. The rollers are set into contact with the grinding wheel by the hand-wheel D, which moves up the slide carrying the roller bodily, and keeping the position of the roller perfectly parallel with the line of traverse of the wheel.

Dust-fan. The machine-bed is designed to catch the dust as it is ground off and a fan fixed underneath draws the dust into a bag ensuring the complete clearance of the ground particles of leather.

As a Varnishing Lathe. After the rollers have been ground the varnishing operation is performed, and to facilitate this it will be necessary to throw off the driving strap of the reversing motion, also the grinder strap; the grinding wheel should then be run to one end of the tube to allow clear space for the work. It is advisable to cover the tube and slide with a piece of cloth or paper when varnishing, so as to avoid injuring these finely finished surfaces.





ATLAS WORKS.

A corner of the STOCK ROOM, showing finished
— ROLLER COVERING MACHINERY. —

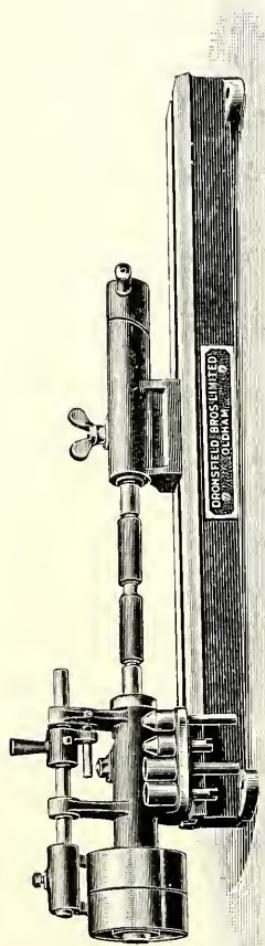
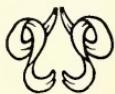


Fig. 24.
Varnishing Machine, No. 55.
Codeword—"Varnitrol."

Varnishing.

SOMETIMES it is found necessary to varnish the rollers frequently, as, for instance, in the case of mule rollers employed in the spinning of fine counts. The Improved Varnishing Machine No. 55 (Fig. 24), is specially made for this work, and it is a simple and neat contrivance by means of which the rollers are varnished whilst revolving quickly, permitting the varnish to be well ingrained in an even layer on the leather surface. The machine takes in all sizes of rollers, and the latter can be inserted and removed in an instant with the aid of the chucks which carry them. Various kinds of chucks to suit the different kinds of roller ends are sent with the machine. Loose boss rollers may be quickly varnished by placing several on a spindle, the ends of which should be threaded and fitted with tightening nuts; this spindle is then placed in the chucks like an ordinary roller. Spindles of this character to suit the particular class of roller may be easily made at the mill.



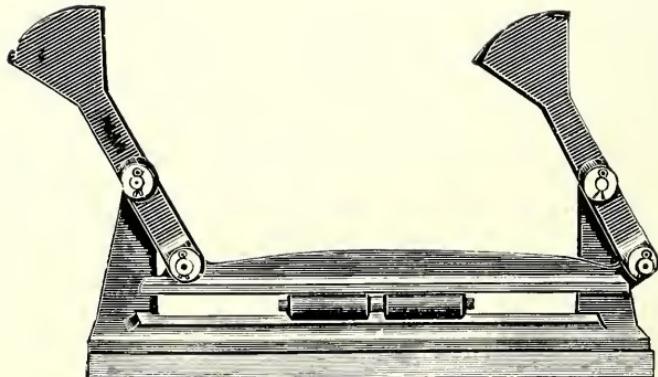


Fig. 25.
Roller Tester, No. 56.
Code Word—"Testroll."

Testing.

NO roller-covering plant is complete without an apparatus for testing the truth of the rollers.

The Roller Tester No. 56 (Fig. 25) is an apparatus with which any defect in the regularity of the roller surface may be discovered at a glance by the "light" test.

Construction. It consists of two parallel surfaces, the upper one suspended to rise and fall to any diameter up to 2in.; the bottom plate is grooved along its whole length to hold the roller in correct position for testing.

Detection. The apparatus is useful for the examination of the rollers in all stages:—

Firstly, on the bare iron (for if a roller is primarily untrue, no amount of care in covering will produce a perfect roller).

Secondly, after covering.

Thirdly, after grinding.

Pairing loose Bosses. It is also useful as a gauge for pairing loose double-boss rollers.

Manipulation. The apparatus should be placed in a window recess, or in any position with a strong light behind, so that the light will reveal any inaccuracy by showing the spaces, if any, caused by the inability of the tester bar to touch the whole width of the roller surface.

The Roller-Covering Shop.

ON Page 68 will be found a plan of a model roller-covering room of a cotton mill, showing the positions and necessary space of a plant of Roller-Covering Machines as described in the foregoing pages. As already stated, this plan will not conform to the size and shape of every room at disposal, but it may be followed generally in its essential details.

Plan carefully beforehand. Before commencing to install benches, cupboards and drawers, the proper and most convenient positions of these should be carefully planned.

Oft-times the furnishing of the roller-covering shop is left to the contractor or joiner who knows little or nothing of their uses, and we know of many cases where the fittings have been most inconvenient, and sometimes useless when the time came to install the machinery. This can be easily obviated at the outset by studying the matter carefully from a practical standpoint.

For instance, the enquiry window is the most frequented part of the room owing to the frequent calls there. This, then, will be the place where the coverer will sit to do the work which entails the longest time, viz :—the piecing of the hots; hence, the necessity of a space being left under the bench at this particular position as a kneehole to allow him to approach the bench as close as possible. Under the ending machine, it is advisable to fix open shelves to carry the rollers taken to the machine for the ending process. These may appear small matters, but they are vital matters all the same, and are better done right at the commencement.

Benches. The benches should be built about 2 ft. 9 in. high and 2 ft. 6 in. wide; this is a convenient working height and width. They should be ranged in all convenient spaces round the room against the walls, so as to obtain the maximum of light and working space.

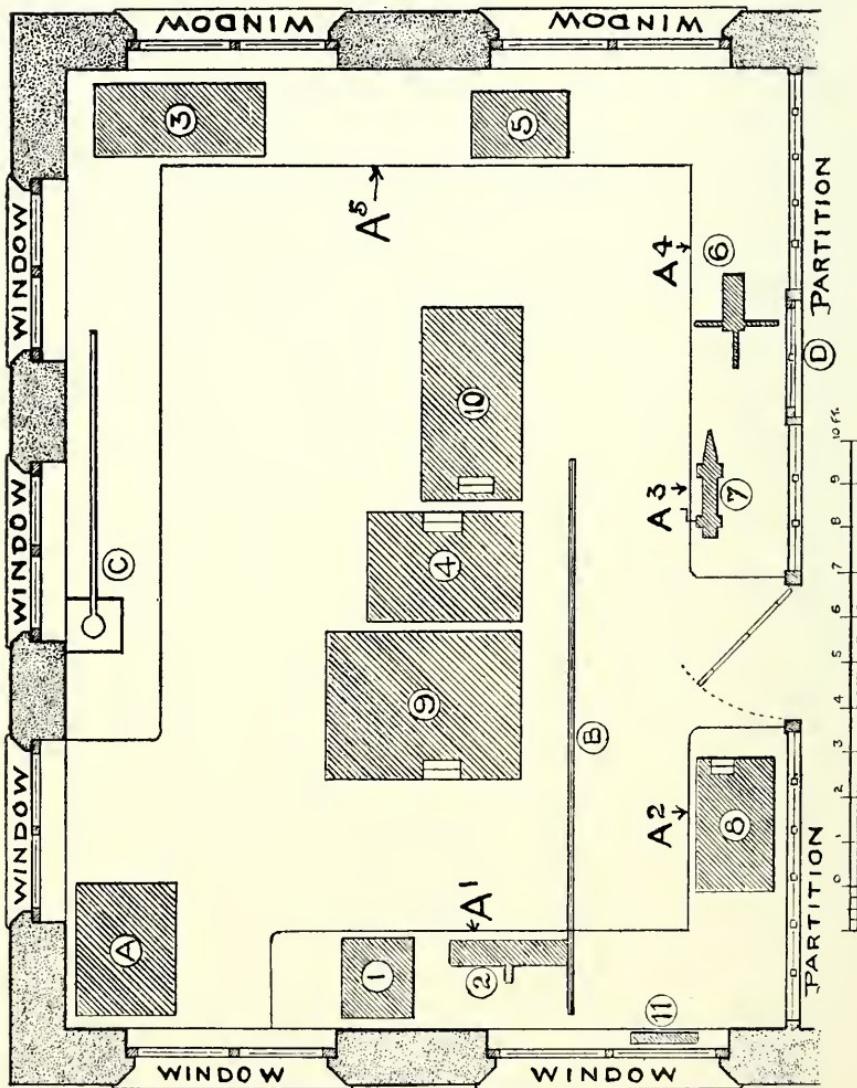
Cupboards. All cupboard doors should be made to *slide*; hinged doors abut into the working passages and impede progress. One end of the room should be set apart for the cupboards. In these will be kept the stock—roller cloth, skins, the ingredients for making paste, cement, and varnish, as well as the working utensils, such as glue kettles, paste receptacles, &c., &c.

Drawers. The majority of space under the benches will be taken up by drawers; these will be of two kinds, viz:—deep, open drawers, and shallow roller rack-drawers. The former should be arranged near the piecing press and pulling-on machines; in one of them, the coverer will keep the stock of cut leathers, hots, and splicings, and in the other the tools and accessories, such as compasses, scissors, knives, rules, oil stone, &c.

The roller-drawers should be made in rack form, one roller deep. These drawers may be made all one size, but the interior should be fitted with notched frames to fit the various types and sizes of rollers used in the mill. They should be mounted on bowls to permit of easy opening and closing although carrying heavy weight.



Plan of Model Roller-Covering Shop.



N.B.—The accompanying plan is that of the roller-covering department of an actual spinning mill in Lancashire. For the information of spinners abroad, we would state that it is the custom throughout England to place the roller-covering shop at the Mill entrance, the roller-coverer or assistant often being deputed to attend to callers, also to weigh coal and goods in general.

: Plan of Model : Roller-Covering Shop

(with machines arranged in convenient positions)

(see page 68).

LIST OF MACHINES.

		Pulleys Inches.	Revs. per min.
1.	Pasting, Measuring, and Cutting Machine.		
2.	Roller Cloth Compressor	- - -	3½ by 2 100
3.	Cutting-up Board.		
4.	Roller Leather Grinder	- - -	9 by 3 450
5.	Splicing Machine.		
6.	Press.		
7.	Pulling-on Machine (power)	- - -	9 by 2½ 100
8.	Roller Ending Machine	- - -	4 by 2 800
9.	Roller Calender	- - -	9 by 2½ 135
10.	Grinding and Varnishing Lathe	- -	9 by 2½ 500
11.	Roller Tester (in window recess).		

FITTINGS.

- A. Gas Engine or Motor.
- B. Line Shaft.
- C. Weighing Machine Scale (frequently placed in the roller-covering room in English mills).
- D. Enquiry Window.

BENCH EQUIPMENT.

- A1. Stock Cupboards with sliding doors.
- A2. Open shelves under bench to carry rollers for ending.
- A3. Drawers to hold cut leathers, hots, and implements.
- A4. Kneehole for operator when piecing.
- A5. Rack Drawers for rollers.

Power required—2 H.P.

LIST OF MACHINES AND APPLIANCES COMPRISING A
Dronsfield Modern Roller-Covering Plant

- Choice of { Patent Cloth Pasting, Measuring and Cutting Machine, No. 33, Fig. 2.
 - Choice of { Improved Paste Spreader, No. 54, Fig. 3.
 - Choice of { Roller Cloth Compressor, No. 91, Fig. 4.
 - Choice of { Improved Cutting-up Board, No. 34, Fig. 5.
 - Choice of { Patent Cutting-up Board, No. 35, Fig. 6.
 - Choice of { Patent Roller Leather Grinding Machine, No. 36, Fig. 7.
 - Choice of { Patent Splicing Machine, No. 37, Fig. 8.
 - Choice of { Patent Screw Press with turntable, No. 38, Fig. 12.
 - Choice of { Screw Press, No. 39, Fig. 13.
 - Choice of { Lever Press, No. 40, Fig. 14.
 - Choice of { Improved Pulling-on Machine, No. 41, Fig. 16.
 - Choice of { Patent Quick-action Pulling-on Machine, No. 43, Fig. 17.
 - Choice of { Horizontal Pulling-on Machine, No. 42, Fig. 18.
 - Choice of { Patent Power Pulling-on Machine, No. 44, Fig. 19.
 - Choice of { Patent Roller Ending Machine, with Fan, No. 45, Fig. 20.
 - Choice of { Ditto. ditto. ditto. No. 47, Fig. 21.
 - Choice of { Patent Roller Ending Machine, without Fan, No. 46.
 - Patent Automatic Roller Calender, No. 48, Fig. 22.
 - Patent Grinding Lathe, No. 94, Fig. 23.
 - Roller Tester, No. 56, Fig. 25.
 - Improved Varnishing Machine, No. 55, Fig. 24.
-

Also the following tools and utensils :

One Stripping Appliance, No. 57, Fig. 1. One Pair 8 inch combined Compasses and Callipers. One Cranked Knive. One Pair Scissors. One Paste Knife. One Stripping Knife. One 2ft. Rule. One Oil Stone. One Rough Stone. One No. 000 Glue Kettle. One No. 1 Glue Kettle. Glue Brush. One 5 inch Chisel.

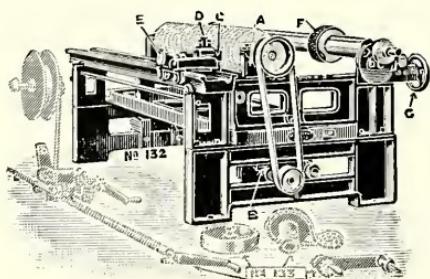
A Few Specialities
— OF —
Dronsfield Brothers

LIMITED — MADE AT
ATLAS WORKS,
OLDHAM,
ENGLAND.



— DRONSFIELD'S —
complete Catalogue will be sent
post-free to bona-fide applicants.

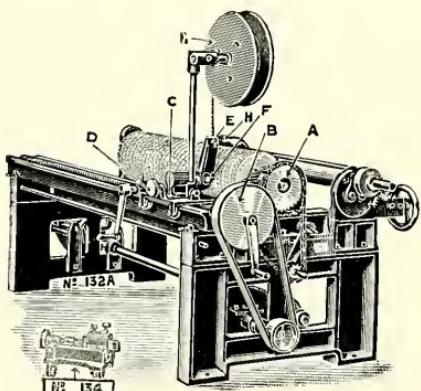
Latest Speciality for Cotton Spinners



Dronsfield's Patent
: Licker-in and :
Saw-Tooth Roller
Grinding and Dressing
Machine, No. 132.
with Patent Wire-Mounting
Attachments, No. 133.



Treat the Lickers-in with
the same care and attention
as the other carding organs
and it will pay you !
They are just as important !



The same Machine mounting new wire
(power driven).

FUNCTION :—

- (1) Straightens bent teeth without breaking them.
- (2) Sharpens dull teeth.
- (3) Grinds the Licker-in true and cylindrical.
- (4) With the Wire-Mounting Attachments No. 133, puts in new wire.

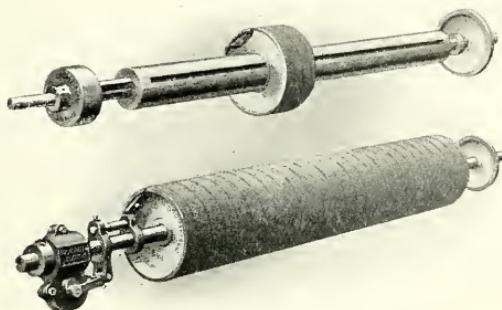


RESULTS :—

Better setting—cleaner carding—less strain on cylinder and flat wire—longer life of card clothing—no need to send rollers away hence sustained production.

The No. 132 Machine, Size 1, will accommodate the Lickers-in of all ordinary standard Cotton Cards.

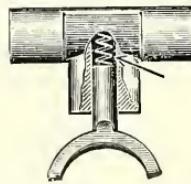
No mill should be without it ! Hundreds already in use.



“Grinders
BY
Dronsfield’s”
(Specification)

SUPERLATIVE QUALITIES
— of the Dronsfield Patent —
— TRAVERSE WHEEL —
GRINDER with Patent Differential Motion.

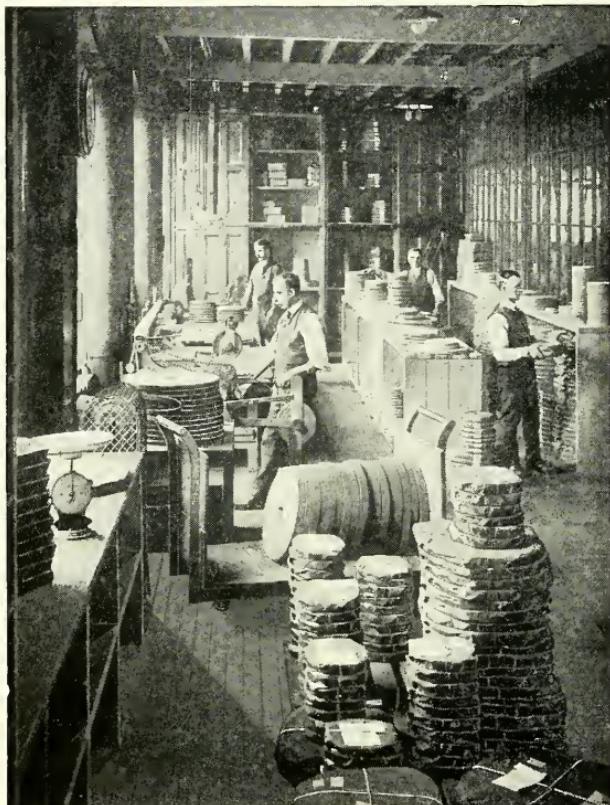
1. Best quality Steel Tube of even thickness. The Tube is ground to templet.
- 2 Carefully hardened Steel Shafts and Sockets.
3. Square-cut threads in traversing screw, minimising risk of locking.
4. Patent Spring Guide Fork, absorbing shock and equalizing pressure with certainty of mesh with screw. (See Sketch).
5. Automatic cleaning and oiling pads fitted in Emery Wheel.
6. Emery Wheel adapted for and covered with “Atlas Brand” Emery Filleting.
7. Patent Silent Differential Motion. This motion saves separate driving of the screw, and imparts a positive traverse in ratio with the rotary speed.
8. The whole is carefully assembled, and balanced to run at a high speed.



A few of the FINE POINTS of
— the Dronsfield Patent —
GRINDING ROLLER with
— Encased Traverse Motion —

1. Steel Barrel, of best procurable quality, even in thickness.
2. Barrel turned and afterwards ground to dead-true surface.
3. Steel Shafts, carefully hardened and ground to templet.
4. Encased Traverse Motion, excluding dust and fly.
5. Adaptation for covering with Emery Filleting.
6. Covered with Dronsfield’s “Atlas Brand” Emery Filleting.
7. Fine Balance. *Every roller is tested before leaving the premises to run without vibration at a speed of 2,000 revolutions per minute.*

DRONSFIELD'S PATENT
“Atlas” Brand Emery Filleting.



EMERY-FILLET TESTING AND PACKING
ROOM : - : ATLAS WORKS.

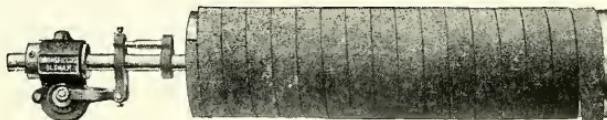
Treatise No. 6

“All About Emery Filleting.”

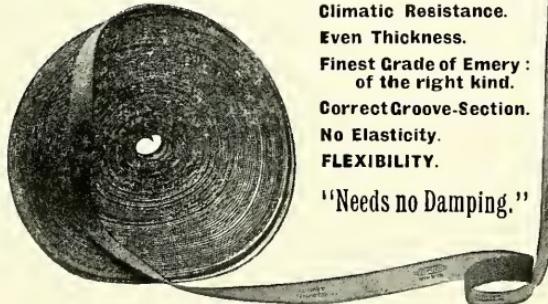
Free on application.

Stocks of “Atlas” Brand Emery Filleting are held by the principal textile-machinery Importers in every manufacturing country of the world.

PLIABLE YET TENACIOUS!

**DRONSFIELD'S PATENT***"Atlas" Brand***EMERY FILLETING.**

TRADE MARK

See the
Trade Mark.None other
GenuineGUARANTEED "A" QUALITY
THE ONLY QUALITY WE MAKE.**Perfected Features :**

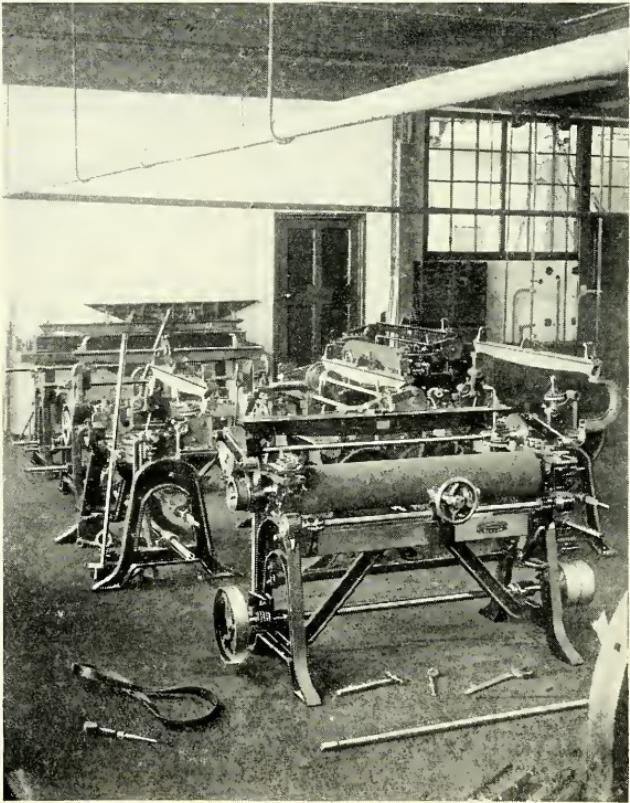
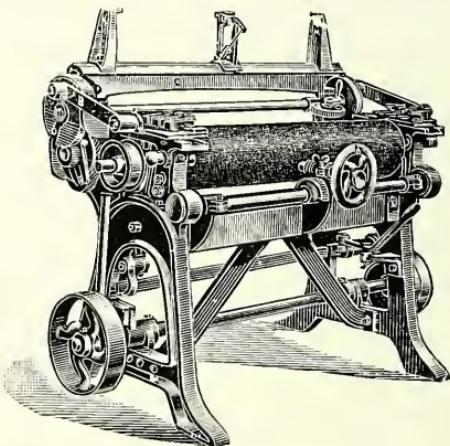
USED THE WORLD OVER!

- Climatic Resistance.
- Even Thickness.
- Finest Grade of Emery :
of the right kind.
- Correct Groove-Section.
- No Elasticity.
- FLEXIBILITY.**
- "Needs no Damping."

The WORLD
absorbs MILLIONS of feet of "ATLAS"
BRAND EMERY FILLETING every year.

Dronsfield's Patent
**Automatic
Flat-Grinding
Machine No. 12**
with Flat-Testing Apparatus.

Code Word—"Autoflat."

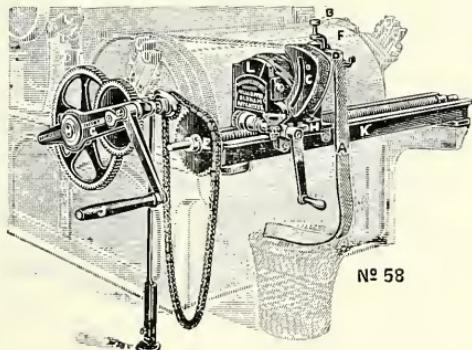


FLAT-GRINDING MACHINE ERECTING SHOP :: ATLAS WORKS.

Nearly 3,000 in use! No Mill should be without it!

Results: Truer Flats, Better Setting, Better Points, Improved Slivers.

YOUR FLATS ARE THE TROUBLE!



Dronsfield's Plant of
- CARD -
MOUNTING
MACHINES.

Dronsfield's Plant of CARD-MOUNTING, and
CARD-PREPARING Machines include:—

- Patent Card-Mounting Machine, No. 58.
- Patent Bare Cylinder Grinder, No. 92.
- Patent Flat Clipping Machine, No. 30.
- Patent Flat-End Milling Machine, No. 102.
- Patent Card-Roller Mounting and Turning-up Machine, No. 61.
- Card-Roller Mounting Brackets, No. 87.
- Patent Jacks. (Turning on Wheels).
- Improved Turning-up Apparatus, No. 63.
- Hand-Turning-up Apparatus, No. 64.
- Sheet Nailing Ratchet, No. 150.
- Patent Licker-in and 'Saw-tooth' Roller Wire Mounting Machine (power driven), No. 132A.

These Machines will clothe every type of Carding
Organ, with Fillets, Sheets, or Flats, viz.:—

- Cylinders and Doffers of Cotton Cards, &c.
- Revolving Flats.
- Swifts and Doffers of Woollen Cards.
- Rollers and Clearers.
- Workers and Strippers.
- Fancies.
- Stripping and Burnishing Rollers.
- Raising Rollers.
- Licker-in and Feed Rollers.
- Inserted 'Saw-tooth' Wire Rollers of every size and type,
&c., &c., &c.

DRONSFIELD BROTHERS LTD.

ARE ALSO MAKERS OF

Patent Grinding Machines

For Roller and Clearer Cards, for grinding 1, 2, or 4 rollers.



Patent Grinding Machines

For Woollen and Worsted Cards—open or fitted with covers and dust fans—8 types.



Patent Grinding Machines

For CARD MAKERS, for surface-grinding, plough-grinding, and side-grinding of every description, for fillets, sheets, and flats.



Patent Grinding Machines

For grinding Raising Rollers; by the use of this machine, better raising and economy in number of passages of cloth result, and the card-clothing lasts longer.

SUNDRY MACHINES MADE BY

DRONSFIELD BROTHERS LTD.,

Dronfield's Patent Wrap Reels

For 4, 5, 6, and 7 Cops or Bobbins. All gears enclosed.
No more trapped fingers!

Rhodes' Patent Portable Flat Cleaner

Thousands in use. One apparatus serves 25 cards upwards, according to condition.

Also Stripping Rollers, Burnishing Rollers.

SOLE MAKERS OF

Hurst's Patent Flat-Brush Cleaning Motions

A cure for dirty flats. Saves Labour and produces cleaner slivers.

DRONSFIELD & MUSGRAVE'S

Patent Yarn Traverse Motion

Quick Reverse—No dwell—Equalized Traverse.
Hollowing of leather reduced and channelling impossible.
Runs in an oil bath!

Patent Strap Bevelling Machines

Strap presses. Belt Eveners.

Slow Running Pumps

For Oil, Water, Suds, &c. Thousands in use on
Automatics, Lathes, &c., &c. "The Pump that gives
no trouble." No Stopping—No Splashing. Dust Fans
for local positions.

Iron Roller Racks

With and without wheels for carrying grinding rollers, &c.
Never hang grinding rollers against a wall, or stand them
on their ends; use racks!

Flat Racks

For transporting flats to and from Card to Flat Grinding
Machine and vice-versa: accommodates a full set of flats
at a time.

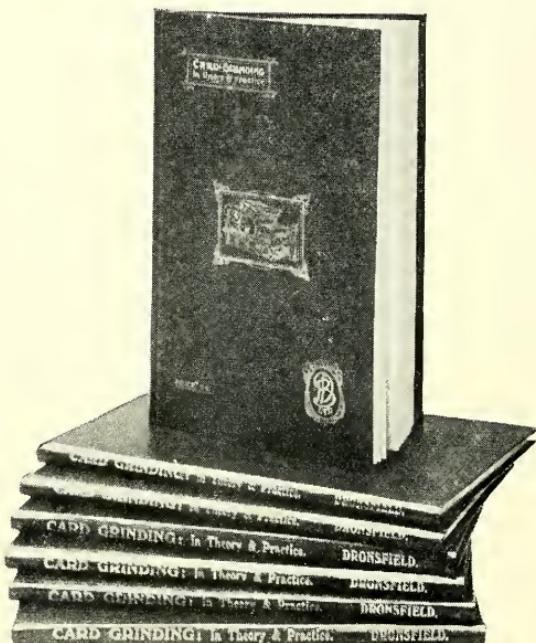
TREATISE No. 14.

“CARD GRINDING

in Theory and Practice.”

140 Pages.

71 Illustrations.



Compiled and Published by

DRONSFIELD BROTHERS
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*The most comprehensive text-book on the
MOUNTING and GRINDING OF
CARDS ever published. ——————*



Gratis and Post-free to Manufacturers and Managers, Carders and
Carding Assistants, of all Textile Mills.



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Practical roller covering

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